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Editorial Notes

Institution Research

So much is necessarily crowded into the few days which we call " Institution Week " that many an afterthought is necessary for assimilation of all the points which call for discussion. There was, for example, the question of research raised in his Presidential Address by Mr. Stephen Lacey when he called attention to the fact that the Research Executive Committee of the Institution is planning to establish closer collaboration than in the past with other research organizations in this country and abroad. For long we have pointed to the benefits likely to accrue from such co-operation. It is with another aspect of future research, however, that for the moment we are concerned here. Mr. Lacey observed that the most fruitful research in relation to expense is not necessarily obtained by the maintenance by the Institution of a permanent research staff, and the time may come when, to a greater extent than in the past, the Institution may decide to make grants for particular items of research to be carried out, with definite terms of reference, in such laboratories within or without the Gas Industry as may seem most capable of producing the best results.

We feel strongly that if the Institution decides to dispense with a permanent research staff it will make an error which it will come greatly to regret. More and more it is being realized that what we may term group research is the surest and most rapid way to solve industrial problems. Brilliant individual research workers should, of course, be encouraged; but generally speaking it is group research which works the industrial oracle. Workers in a group studying particular problems enjoy the inestimable benefit of exchange of ideas—a stimulating and wholly necessary exchange. Working on common and associated problems, industrial investigators can help one another, and the Industry they serve, enormously. Nor should the need for continuity of research be forgotten. No research worker, we think, would deny that it takes years to appreciate properly the problems actually confronting a particular industry and the means by which these problems can best be tackled and solved. Long continued and intimate contact between research workers and industry is essential. As far as our own Industry is concerned, there is another aspect of the matter, and by no means an unimportant one. The maintenance of a research staff at Leeds University has lent the Industry a prestige value in the eyes of young men contemplating the long training involved in the gas engineering course at the University and has also provided a direct contact between student and research worker, and, through the latter, the Gas Industry itself.

The price the Gas Industry pays for its group research is farcically small, while the benefits it has received from it are out of all keeping with the money spent, though unfortunately the benefits are not, again generally speaking, at all appreciated. It cannot be suggested, for instance, that the group research on liquor effluents has proved unfruitful. There have, of course, been criticisms —and not unjust criticisms—of some of the work. Does not the fault, however, lie in the fact that the Committee directing the various pieces of research has hardly known what is wanted? By all means make grants for particular items of research in " such laboratories within or without the Gas Industry as may seem most capable of producing the best results." But let these grants be additional to, and not a substitute for, the maintenance of a permanent research staff undertaking group research for the Gas Industry. Members of the Institution have only to turn to page 18 of the 74th Annual Report and Accounts to have forced upon them once again the negligible sum which what prides itself, quite rightly, in being a great public utility offering a wonderful service is prepared to pay for research. More research in other places and in other directions, yes. But it will, we suggest, be an unsound step if this implies the scrapping of a research organization carefully built up over many years and capable of yielding first-class results.

Constant Quality

THE Papers presented at the Meeting brought out clearly the necessity for the closest possible co-operation between every side of the Gas Industry—between the maker of gas, the distribution engineer, and those concerned with the design, development, and performance of gas using appliances. The public demands not gas but the service which gas can perform, and the public's expectations of this service daily become more exacting. There can be no doubt that the future of the Gas Industry will depend

on giving not merely a supply of gas which does not fail, but a supply which does not vary in quality. Nor is this quality to be measured in terms of so many British Thermal Units per cubic foot. Specific gravity and flame characteristics must be taken into account, as, of course, also must the maintenance of constant pressure at the appliance. At the moment we do not appear to know just what we want in this matter of gas quality, and the giving of a still better gas service must have as its starting point the setting out of definite limits allowable for variation in the characteristics of gas supplied. This, of course, has been realized, and the Joint Committee of the Institution and Leeds University are studying the combustion characteristics of various gases with the aim of eventually simplifying the design of appliances for use in the Industry, the evolution of burners possessing the widest range of useful service, and arriving at information to show to the gas manufacturing side the type of gas desirable and the limits of variation allowable. There is no doubt that the time will come when the gas supplied will conform to standards a good deal narrower than those at present considered necessary.

At the Institution meeting Mr. E. V. Evans, who is Chairman of the Joint Committee, maintained that it is not enough for a gas undertaking to regulate from time to time the degree of steaming a charge, or the percentage of water gas added, or the amount of oil used, by consideration only of the cost of manufacture. "Many of our first-class brains," he said, "have been devoted to producing gas cheaply, and there is to-day a very interesting race between the manufacturers to produce a therm of gas of a certain calorific value at a fraction less than a competitor. Unwittingly, the advantage of that fraction less may be much more than counterbalanced by the trouble involved in the manufacture and subsequent control of the gas appliances." There is no question but that all phases of the Gas Industry's activities will have to be regarded broadly from the service angle—the satisfaction of the consumer with a trouble-free heat service. We certainly need a much greater measure of standardization of gas quality. Taking calorific value alone, this ranges from 200 to 600 B.Th.U., and between these two extreme limits 28 different values have been selected. The makers of gas appliances are forced to provide gas and air adjustments to cover wide ranges, and such adjustments are capable of abuse as well as use. The present irrational policy on this matter alone will have to give place to much more uniformity, and we hope and believe that the grouping movement will play its part in effecting the change.

At the same time we cannot afford to whittle away the enormous advantage which the Gas Industry enjoys in the flexibility of its process, and while the problem, as we have emphasized, must be approached from the service angle, it must also be borne in mind that 65% of the families in this country depend on incomes of £3 or less and 85% on incomes of £5 or less. Any substantial increase in the cost of gas manufacture, with a view to ensuring a better service, would obviously defeat the object of making that service generally available. Our view, however, is that the reduced costs of maintenance, and the like, due to the supply of gas of uniform quality would more than outweigh the possible slight increase in cost to produce such a gas. The other advantages of gas of uniform—of course, the right—quality cannot be assessed in terms of pounds, shillings, and pence. At the moment we are awaiting a formula as to what constitutes the desirable characteristics of gas. When that formula is agreed upon, gas engineers, gas chemists, and the designers of gas-making plant should in collaboration find no insuperable difficulty in meeting economically the stated requirements.

The Sulphur Problem

While we are awaiting this formula, however, what are we doing about the sulphur in gas? For years the inadvisability of sending out gas with a high sulphur content has been forcibly pointed out. At the meeting of the Institution in 1914 Dr. Charles Carpenter urged gas engineers to do all in their power to eliminate sulphur from gas "I do urge you," he said, "to look at this thing from the point of view of those who are immediately concerned with the sale of gas. I think we engineers have in the past—I make confession for myself, at any rate—been too wholly governed by the requirements within the works. I think we require to give a much more open ear in the future than we have done in the past to what those who have to sell our gas have to tell us with regard to what the users have to say about it. . . . I do say take out the whole of the sulphur compounds by all and every means in your power. . . . You do not believe me, I know, any more than you believed those predecessors of mine. But I conscientiously believe it." Commenting on the Lecture in the "Journal" we remarked: "There is to-day a disposition in the Industry to say, as to the sulphur purity of gas, that it is 'good enough,' and to adopt this as a sufficiently clinching argument against those who, like the lecturer, maintain that duty ought to have a higher ideal, and an energy to reach a higher plane, so long as injury is not wrought in other respects. . . . We cannot deny that while incrustations form on metal work, or injury, though slight, be committed in any other way through the quantity of sulphur remaining in the gas, the supply is not all that could be desired, and that it would be intrinsically better if the condition producing the harm could be removed. Nor can we assert that the maximum of refinement in the purity of gas is not, in the face of competition, in the best interests of the future of the Gas Industry. To flout conditions that common sense tells us are the best is not an act of prudence. To speak of a higher refinement as a work of supererogation, if the refinement can be attained on economical lines, and for which it would be to the advantage of the consumer to pay, is to reject foolishly a factor that will make for the strengthening of the competitive position of the Industry in the future." Twenty years later Dr. Harold Hartley put before the Institution the slogan "Sulphur must go."

Has sulphur gone? To-day throughout the country apparently less than 10% of the coal gas supplied is treated for organic sulphur removal. It is difficult to discover any adequate excuse to explain away this sorry state of affairs. It is nothing short of ridiculous that while energies are being expended on the works in reducing by a fracture of a penny the cost of the therm into holder the possibilities of what, in the heating field, are tantamount to a reduction in the price of gas of pence per therm are being ignored. The potentialities of the flueless heating load—what we have termed "background heating"—are enormous. Mr. Masterman works it out that the introduction of flueless heaters into halls and passages in smaller property would, on the basis of one such heater per home, represent an increase of nearly 50% in the sales of gas. This load will not be gained by supplying a sulphur laden gas.

The Economic Aspect

It is not as though sulphur removal was beyond the scope of the small undertaking. At the Institution meeting Mr. Norman Hudson explained what he has accomplished at Mirfield—a 100 million undertaking. Two years ago the Mirfield Gas Company decided to install an oil-washing type of benzole recovery plant, not primarily to make money out of benzole extraction, but rather to make benzole extraction profits pay for sulphur removal and naphthalene extraction. To-day the plant is producing over 2 gallons of benzole per ton of coal carbonized and gas is being supplied to the town with just over 1 grain of naphthalene and between 7 and 8 grains of sulphur per 100 cu.ft. This has resulted in decreased maintenance costs and added confidence in recommending flueless heaters. As for operation and supervision costs, these are very little more in a 100 million works than those for operating a straight benzole recovery plant. In connection with this method of sulphur removal entailing at the same time the removal of benzole from the gas, Mr. Finlayson, without in any way questioning the economic and national soundness of benzole recovery at the moment, queried whether it is wise to make a fundamental improvement like sulphur removal dependent on the removal of benzole. Might not the time come, he asked, when with a public accustomed to sulphur-free gas it would be necessary to extract benzole purely for the sulphur removal stage? We quite appreciate Mr. Finlayson's line of argument in this regard. We feel sure, however, that should benzole recovery, due to changed circumstances, become undesirable or uneconomic—and by " undesirable " we are thinking of the value of benzole as an enricher of gas—then other processes for sulphur removal will be made available. Already such processes are being developed, and investigation should be continued on these alternative methods—as no doubt it will be continued. At the Institution meeting, too, Mr. Charles Cooper dispelled an assumption fairly generally held that in order to ensure a low sulphur content in gas by the oil washing process it is necessary to extract all the benzole. Actually, as a general rule, it is possible to reduce the sulphur content down to 5 grains per 100 cu.ft. with a variable extraction of benzole of from 1 to 3 gallons per ton.

In the foregoing we have spoken of the likely added cost of gas production in making a gas of constant quality and satisfactory characteristics. But this cost should not be great, and there is no doubt in our mind that it would be more than counterbalanced by actual savings on the district and a far higher prestige value for the Gas Industry. Our feeling is that in the future gas undertakings will have to modify their insistence on working plants at their maximum output, and have a more ample reserve. At the Institution meeting Mr. Finlayson suggested one method of meeting peak loads without altering the characteristics of the gas made. This is the operation of carbonizing plant under steaming conditions making gas of required calorific value, and then when peak load arises bringing coal throughputs and calorific values of the coal gas up to the maximum and diluting with blue water gas made externally. This is a feasible and practical method of maintaining regular characteristics. At the meeting, too, Mr. Townsend gave interesting particulars concerning the means he has adopted at Colchester for ensuring at all times a gas of reasonable uniformity. He has horizontal retorts, benzole extraction plant, and water gas plant. The charge is steamed, and when there is a sudden increased demand for gas steaming of the charge is discontinued and the amount of water gas separately manufactured increased. In this way the change in specific gravity which would otherwise occur is counteracted. Also at times the benzole plant is shut off or the water gas lightly carburetted. Admittedly the maintenance of constant quality costs energy and money; but the expenditure of both is well worth while.

The Waverley

Adhering to a custom which extends back over 76 years, the world's oldest gas organization held its annual meeting once again in the Scottish capital, amid all the traditional associations from which " the Waverley " took its name. When but a single general meeting is held in a year, all the activities usually spread over several such gatherings have to be compressed into a relatively short period, for Scottish gas managers are busy men and not a few of them come from far afield to attend the meeting. The gathering on Thursday and Friday of last week was attended by the success which the passing years have made a foregone conclusion, and the thanks of all are once again due to the indefatigable Hon. Secretary, Mr. R. J. Philp, for his usual efficient organization, and to all those others who contributed to the success of the meeting.

Reversing for once their workaday precepts, the members placed pleasure before business and spent the first day enjoying themselves according to their several inclinations either on the bowling green or golf course at Duddingston, renewing old friendships and making new ones. On the Friday morning a large number of members from all parts of Scotland assembled in Edinburgh for the more serious business of the meeting. But it is typical of the Association that whether gathered for business or pleasure the same spirit of good fellowship and cordiality combine to render their meeting anything but dull; no matter how far from one's native town, one immediately feels " at home " among the members of the Waverley Association.

This year's meeting was of more than usual interest by reason of the Association's action—to quote a phrase used in the course of the day—in " demanding the return of one of its exiled sons " to fill the Presidential chair. And who more worthy could they have chosen for this signal honour of occupying the chair for a second time—shared only by two other members—than Mr. W. B. McLusky, one of the best-known Scotsmen whom they have ever sent across the border? Mr. McLusky must have been proud to take the chair again after an interval of 37 years; and his fellow members were proud also, and glad to see that after 25 years in charge of the destinies of the Halifax Gas Department " W.B." is still as true a Scot as ever. Whether or not the recall of Mr. McLusky in this particular year was fortuitous we cannot say, but it was a singularly appropriate choice, for, as we have indicated, he completes this year a quarter of a century's service as Engineer and Manager at Halifax. What better tribute could be paid to so enviable a record by professional colleagues in his native land than to ask him to return to preside over their meeting? Many more well-deserved tributes were paid at the Association's lunch to a President who is loved and esteemed by all with whom he comes in contact, and, we may add, respected by a far wider circle of gas men who know him only by his pioneer work at Halifax.

Little more need be said here to record the success of a meeting which is reported fully on later pages. One little remark, however, was made by Mr. James Jamieson

(Engineer and Manager of the Edinburgh Corporation Gas Department), replying in his capacity of President of the North British Association to the toast of "Kindred Associations," which is worthy of emphasis. He was referring to the "isolation" of the Waverley Association in that it was not yet affiliated to the parent body. As he jocularly observed, it is too late for the Waverley to annex the Institution; affiliation is the only reasonable course, which will bring direct representation in the counsels of the Industry to those whose sphere of activities lies beyond the Border. The forging of this final link would make complete the nation-wide chain of representation with and through The Institution of Gas Engineers. We have no doubt that the Committee of an Association which, though old in years, is ever young in outlook will give Mr. Jamieson's suggestion the consideration it undoubtedly deserves.

The Finance Bill

PUBLIC utility undertakers have every reason to be satisfied with the Finance Bill. The National Defence Contribution as originally proposed would have applied to gas undertakings, although the amount of tax, being based upon the excess profit over a standard average, would in most cases have been small. There can be little doubt that, whatever the amount of tax which would have been payable might have been, the complicated calculations necessary to assess the amount due to the Revenue, if any, would have involved a vast amount of accountancy, assessment, and fruitless labour. In the end it would probably have been demonstrated that the tax which was due was considerably less in amount than the expense involved in connection with its assessment. The Government have wisely yielded to the general feeling of industrialists throughout the country and withdrawn the tax.

The new tax has the merit of simplicity, and it is gratifying to note that all statutory public utilities where prices and dividends are controlled by Act or Order are to be exempt. While non-statutory undertakers are liable to the new tax, that liability will only exist in cases where their annual profits exceed £2,000 a year.

In the discussions that have centred round the National Defence Contribution many have overlooked that Clause in the Finance Bill which deals with the allowance for the depreciation of mills, factories, &c. This Clause repeals, and is substituted for, Section 18 of the Finance Act, 1919, under which an allowance of one-sixth of the annual value of "any mills, factories, or similar premises" was formerly granted. Whatever may have been the meaning of these somewhat obscure words, it was the contention of the Inland Revenue that the allowance could be claimed only in respect of buildings which might be liable to depreciation due to the vibration of machinery.

Since 1919 the extent of the allowance has been a matter of considerable doubt, but few gas undertakers have succeeded in obtaining any allowance in respect of buildings which did not contain moving machinery. The new Finance Bill settles the question. Instead of the old allowance of one-sixth, undertakers may now claim "an amount equal to 1% of the actual cost to the person carrying on the trade of any building and the site thereof which forms part of the premises and contains, and is used wholly or mainly for the purpose of operating, machinery worked by steam, electricity, water, or other mechanical power."

Although this provision is more restricted than the construction which the Courts might have placed upon the terms of the Finance Act, 1919, yet it is thought that in actual practice the new provisions will enable undertakers to secure an allowance at least as large as that conceded by the Inland Revenue in past years.

Personal

Many friends of an old friend—Mr. Thomas Glover, late of Norwich—will have been interested in reading of the appointment of his son BERNARD as Chief Engineer to the Primitiva Gas Company of Buenos Aires, which was referred to by the Chairman at the Annual Meeting of Primitiva Holdings, Ltd., in London on June 1.

Mr. Bernard Glover was educated at Mill Hill School, and on leaving he joined his father's staff until old enough for active service, when he was deputed to superintend the manufacture of hydrogen gas for airships. Following the Armistice he went to the South Metropolitan Gas Company for twelve months, afterwards going to Leeds University, where he took his degree of B.Sc., subsequently graduating to M.Sc. After a further period of service at Norwich, he was sent by West's Gas Improvement Company to the Continent to assist in starting and adjusting vertical retort installations, and was engaged on this work until receiving his appointment as Technical Assistant to the Primitiva Company eleven years ago.

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Mr. H. E. STONE, who has been appointed General Manager of the Hong Kong and China Gas Company and of the Colombo Gas and Water Company, is now in London on a short business visit.

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On June 15 the Walsall Town Council resolved that, as from the date of the retirement of Mr. J. J. WILSON, the present Works Superintendent, Pleck Gas-Works, Mr. R. N. HATELEY, Technical Assistant, be appointed to the position of Works Superintendent, Mr. S. BROCKBANK, Technical Assistant, be appointed Deputy Engineer and Manager, and Mr. J. A. TOMES, Technical Assistant, be appointed First Technical Assistant in Grade 4 of the Council's Grading Scheme.

Forthcoming Engagements

June.

24.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—County Meeting at Luton.

25.—I.G.E.—Joint Lighting Committee, 2.30 p.m.

25.—B.C.G.A.—Scottish Conference at Peebles Hydropathic.

(There will be no meeting of the Central Executive Board of the National Gas Council during the month of June.)

July.

1.—MIDLAND JUNIORS.—Visit to Buxton Gas-Works and the Silica Firebrick Company, Ltd.

2.—MANCHESTER ASSOCIATION.—Meeting at Leeds, 11.15 a.m.; afternoon visit to the Yorkshire Copper Works, Hunslet.

8.—I.G.E.—Meeting of Refractory Materials Joint Committee, Stoke-on-Trent, 2.30 p.m.

2.—I.G.E.—Joint Committee on Complete Gasification under Pressure, Department of Scientific and Industrial Research, 16, Old Queen Street, S.W. 1, 3 p.m.

9.—SOUTHERN ASSOCIATION.—Summer Meeting at Southampton.

13.—I.G.E.—Council Meeting, 10 a.m. (*The Special Council Meeting which was to have been held on June 18 has been cancelled.*)

14.—B.C.G.A.—Executive Committee Meeting, 11.30 a.m.; General Committee Meeting, 2.30 p.m.

15.—I.G.E.—Gasholder Committee, 2.30 p.m.

Sept.

9-10.—NORTH BRITISH ASSOCIATION.—Annual Meeting at Edinburgh.

News in Brief

CURRENT EVENTS IN THE GAS INDUSTRY

Constant Pressure Governors are to be fitted to gas fires in 2,152 municipal houses in Blackburn.

The Society of Chemical Industry are to hold their 56th Annual Meeting in Harrogate from July 5 to 9 under the Presidency of Viscount Leverhulme.

To Improve the Office Accommodation the Clitheroe Gas Committee are converting a coal store into a fitters' workshop and stores accommodation.

Fifty-Six Five-Light Gas Lamps are to be installed for the street lighting of the municipal housing scheme at Hill Street, Kirkcaldy, at an estimated cost of £860.

A Three-Lift spiral-guided gasholder with steel tank, capacity 500,000 cu.ft., including piled concrete foundation, is to be supplied and erected for the City of Durham Gas Company by Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Stockton-on-Tees.

Combustion Appliance Makers' Association (Solid Fuel) has just published the Proceedings of its First Annual Conference (from the Association, 54, Victoria Street, price 2s. 6d.). The Proceedings include three Papers, "The Progress of Solid Fuel Burning Appliances," and a discussion in which twenty speakers took part.

The Series of Cookery Demonstrations organized by the Leamington Priors Gas Company once again proved an outstanding attraction. Demonstrations have taken place in the villages, and added attractions were the cake-baking competitions. Combined with the demonstrations was an exhibition of domestic gas apparatus.

An Increase in the Price of Gas has been decided upon by the Town Council at Arbroath by 4d. per 1,000 cu.ft., thus raising the price to 2s. 10d. per 1,000 cu.ft. for ordinary consumers and 3s. 2d. for slot meters. This advance has been rendered necessary by an increase approximately of 5s. per ton for coal over that of last year.

The Recovery of Benzole is under consideration by the Clitheroe Corporation Gas-Works Committee following a report of the Engineer and Manager upon the subject. The Manager reported on the plant necessary for the work. Before a final decision is made as to installation, systems in use at Padiham and Oswaldtwistle gas undertakings will be inspected.

Opening an Exhibition of gas appliances at Limerick, the Mayor, Alderman Bourke, said that since the last exhibition eight years ago the municipal gas concern had steadily progressed and last year the sale of gas reached a record figure. The price of gas had been consistently reduced notwithstanding the expense incurred in replacing and renewing necessary plant.

Among the Provisions of a Special Order for which the Brighton, Hove and Worthing Gas Company intend to apply to the Board of Trade is one to empower the Company to raise additional capital by the creation and issue of ordinary and/or preference stock and to empower the Directors to reserve a proportion of any future issue of capital for exclusive offer to consumers and employees.

A Comprehensive Display has been arranged by the Manchester Corporation Gas Department in the Manchester Ideal Homes Exhibition now being held at Belle Vue, Manchester. They have planned a representative exhibition of gas appliances, prominence being given to water heaters, refrigerators, home laundry equipment, and self-lighting gas fires in many artistic designs and colours.

In Our Article on the United Kingdom Gas Corporation, Ltd., in last week's "JOURNAL" (p. 857) there was a photograph bearing the caption "'Addressograph' plates are stamped at Head Office for the use of the constituent undertakings in correspondence with their consumers." Actually the machine illustrated was an Adrema embossing machine made by Adrema, Ltd., Jubilee House, Oxford Street.

To Encourage the Reading of Papers by students of Fuel Technology, the Council of the Institute of Fuel have decided to make an annual award of a Medal, together with a prize consisting of books and/or instruments to the value of £5. The award will be made for a Paper submitted by a Student Member of the Institute or by any Student under 25 years of age of a University or Technical College in the United Kingdom.

Workmen Employed by the Clitheroe Corporation Gas Department have been granted a holiday for June 26 for their annual trip, and those who have been with the Corporation for twelve months and over will be paid their wages for the day.

An Extension of the Limits of Supply is sought by the Maldon Gas Light Company in a Special Order, under the Gas Undertakings Acts, 1920 to 1934, for which they give notice of their intention to apply to the Board of Trade. (The Undertaking is owned by the British Gas Light Company.) Other provisions increase, define, and limit the capital and borrowing powers, and empower the Directors to erect gas-works plant on certain specified land.

As a Going Concern, the gas-works at Tralee, County Kerry, owned by the Tralee Urban District Council, are offered for sale. Tralee is lighted by gas, and the Urban Council state that they will consider offers on the basis of the free public lighting of the town by the purchaser for a certain number of years as the whole or part of the purchase price. Large sums have been expended in recent years on the laying of new mains, and sales for the year ended March showed a substantial increase on those for the preceding year.

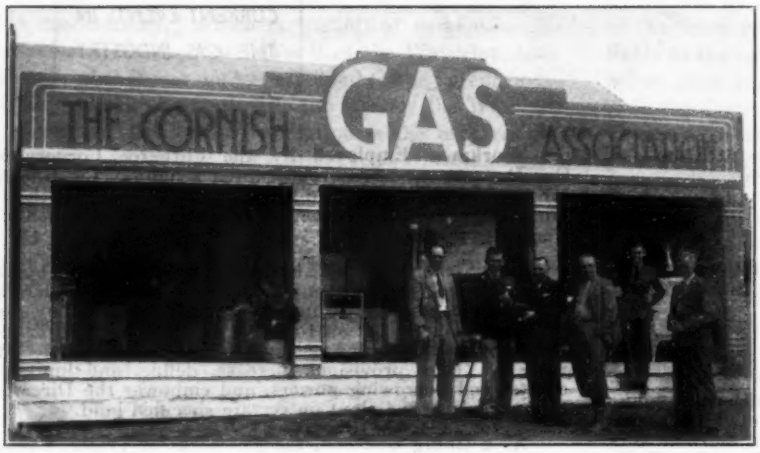
In the Proceedings of the Gas Committee submitted to the June meeting of the Rhyl Urban Council it is reported that a letter had been received from Stellite, Ltd., Queensferry, stating they had acquired a number of gas undertakings in North Wales with the object of formulating a gas grid for the whole of the district, and asking whether the Council were prepared to consider the sale of their Undertaking to the Company. It was resolved that the Company be informed that the Council do not desire to dispose of the Undertaking.

A Fifteen-Year Contract for the lighting of the new Promenade Road, Canvey Island, has been secured by the Gas Light and Coke Company. The lighting will conform to Class F of the British Standard Specification for Street Lighting, and if desired this can be increased to Class E merely by changing the mantles. The installation will consist of 22 high-pressure lamps, fitted with specially designed mantles and directional refractors to give a perfect diffusion of light. Gas is also used for the illumination of many other roads on Canvey Island.

The Manchester District Association are meeting at Leeds on July 2, when the President, Mr. R. N. Webb, will deliver his Presidential Address. The business session takes place in the Town Hall at 11.15 a.m., following which luncheon will be provided in the Lord Mayor's Rooms at the Civic Hall by the courtesy of the Lord Mayor and at the invitation of the Chairman and members of the Leeds Corporation Gas Committee. An opportunity will be provided for members to inspect the gas central heating and cooking apparatus at the Civic Hall, and after lunch a visit will be paid to the Yorkshire Copper Works at Hunslet.

The Colwyn Bay Council have decided not to enter into negotiations with Stellite, Ltd. (recent purchasers of the Conway, Caernarvon, and Llandudno gas undertakings), as to the sale of the borough gas-works. Councillor Wilde questioned the wisdom of coming to a decision without knowing what price for the undertaking Stellite were prepared to offer. The Chairman of the Lighting Committee (Alderman Oswald Berth-Jones) pointed to the service which was being obtained from the gas undertaking, and to its sound financial position. He said it had a very strong reserve fund. He compared the price of gas at Colwyn Bay with the charges which had been made in towns whose gas-works had been acquired by the Stellite Company. He said the undertaking was bought in 1901 for £66,300, and a great deal of capital had been spent since then. In four or five years' time that amount of £66,300 would have been cleared off, which would mean a saving to the town of at least £2,000 a year in interest and repayment. With the exception of Wrexham, Colwyn Bay was charging less for its gas than any concern in North Wales. He agreed with amalgamation, but was definitely opposed to any group of financiers taking control of gas and electricity undertakings.

A Co-operative Effort from Cornwall



Our photograph shows the Gas Display which was arranged by the Cornish Gas Association, representing the whole of the Industry in Cornwall, at the Royal Cornwall Show at Wadebridge on June 9 and 10. During the two days the Show was visited by upwards of 20,000 people, and considerable interest was evinced in the Gas Exhibit, which was enlivened by the B.C.G.A. Sketch Artist. A good deal of business resulted from the Exhibition, and every enquiry was followed up by the Gas Undertaking concerned. Mr S. A. Martyn (Wadebridge) and Mr. T. J. Greenwood (Bodmin) were responsible for the fitting and equipment of the stand, while Mr. F. G. Kingwell (Falmouth), the Hon Secretary and Treasurer of the Cornish Gas Association, made the necessary arrangements. These three gentlemen are to be seen in the accompanying photograph along with Mr. A. H. Dunn (Launceston).

Co-Partnership at Ipswich

Coronation Supper and Social

On June 15 the Directors of the Ipswich Gas Company entertained at a supper and social evening 380 employees of the Company. Mr. Henry Woodall (Chairman of Directors) presided during the evening, and also present were Mr. Philip W. Cobbold (Vice-Chairman), Mr. Frank Prentice, Mr. H. St. G. Cobbold, and Mr. A. J. Haward (Directors), and Mr. G. A. Mallett (Manager and Secretary).

Welcoming those present, Mr. Woodall said that the original co-partnership fund was established in 1914, the Directors deciding to give the co-partners a share of the profits by setting aside each year a certain amount to be distributed as a bonus. The main object was to induce all employees to take an even greater interest in their work, to give them a new motive in their endeavour to promote the prosperity of the Company, and to give them the opportunity of improving their position in life by saving their annual bonus, and becoming stockholders in the Company.

The first bonus, Mr. Woodall added, amounted to £801; to 209 co-partners. Last year 309 co-partners had a bonus of 6½%, amounting to £3,601. Since 1914, co-partners had received £43,628 in bonus, and £9,733 in interest and dividend. Stock valued at £32,690 had been transferred to co-partners, and the present holding amounted to £20,200.

"I am glad to know that, for the most part, the right spirit of co-partnership is being maintained," Mr. Woodall declared, "that the men are leaving their bonuses to accumulate, and some of them are contributing week by week from their wages, so as to increase their holdings."

Referring to the Company's pension scheme, Mr. Woodall said that the Directors had been building it up for many years. Employees had made their contribution but the Company had made large payments to put it on a sound foundation, and to-day there was something like £100,000 invested in the names of the trustees.

North of England Association (Auxiliary Section)

Meeting at Middlesbrough

Middlesbrough Corporation Gas-Works, one of the first plants in the country to utilize coke oven gas for town supply, was visited by members of the Auxiliary Section of the North of England Gas Managers' Association following their meeting in the Council Chamber of the Municipal Buildings on Friday, June 18.

Mr. John W. Pallister (Engineer and Manager of the Corporation Gas Department), Chairman of the Section, presided and later gave his Chairman's Address, which will be found on other pages of this issue.

A vote of thanks to the Chairman was proposed by Mr. T. T. Tarn (Darlington), who said that the Address was of particular interest to them in the North-East where now other undertakings had also utilized coke oven gas or were considering doing so. Mr. Pallister had mentioned the heavy load hour between noon and one o'clock on Sundays and the wash-day load on Tuesdays. At Darlington they had a similar experience on Tuesdays.

Mr. F. J. Webster (West Hartlepool) seconded, and the vote was carried with acclamation. A vote of thanks to the Chairman and members of the Corporation Gas Committee for the facilities provided to visit the works and their kind invitation to tea was proposed by Mr. George Neil (Southampton) and seconded by Mr. W. L. Robertshaw (Sunderland).

The members then visited the gas-works at Commercial Street, special transport having been arranged for them. Bad weather reduced the attendance below normal figures, but fortunately the occasional showers did not interfere with the enjoyment of the visit.

Interest in the visit naturally lay in one of the principal problems of coke oven gas supply—alternative supply should the coke oven supply fail through defect or labour trouble. Hence Mr. Pallister indicated how the plant at Commercial Street would deal with such an emergency adequately within a few hours. The members were particularly interested in the automatic operation of the carburetted water gas plants.

The purifying plant was also a source of interest, and Mr. Pallister's success in using a bitumen compound as a protecting medium on the bottom plates of some of the boxes was noted. Another efficiency factor which aroused interest was the display in different parts of the works of sectional plans in frames of gas and other mains, valves, &c. The reconditioning shop was a lesson in cooker renovation. The new building for the distribution workshops, in course of erection, was also visited, an indication of the extending work of the undertaking.

The members later visited the Cannon Street Works.

A "Cold" Display from Coventry

This topical refrigerator display was arranged recently in the Showroom Window of the City of Coventry Gas Department.

London Juniors at Luton

Guests of Their President's Company

Some 150 members of the London and Southern District Junior Gas Association with their ladies were the guests on June 19 of the Luton Gas Company, one of whose chief assistants is their President, Mr. Roy Summerson. So large a muster was not only a compliment to the President but also a proof of the members' foreknowledge that they were going to spend a particularly interesting and enjoyable day—and through the generosity of the Directors of the Gas Company and the kind co-operation of all concerned such it undoubtedly turned out to be.

Being the Association's summer visit and ladies' day, something of interest had to be found for those of the latter who did not share the members' inclination to a "busman's holiday" in the good hands of the Luton Gas Company. Few more acceptable ways of entertaining a party of ladies could have been chosen than the idea which was hit upon. What ladies are not intimately concerned with the latest fashions? What more striking a feature of present-day *modes* than my lady's hat? What more interesting visit could be paid, therefore, than to a factory where such important items of fashion are produced? Through the courtesy of Messrs. Sunman & Hewson and Messrs. Currant & Creak, the ladies were enabled to inspect these up-to-date hat factories during the morning. Thus assured that their ladies were safely bound for an absorbing morning, the members were free to acquaint themselves with the many interesting things which the Luton Gas Company have to show on both technical and commercial sides.

First the works; here there are two separate sections, each complete with its own coal handling, carbonizing, purifying, and metering plant, the two purified gas streams joining immediately prior to the gas-drying plant before being passed on to the holders. In the older section the coal is carbonized in horizontal retorts, and in the newer in Woodall-Duckham continuous verticals. From 67% to 76% by volume of the gas is made in the latter, the remainder being shared by the horizontals and the C.W.G. plant.

The members were also enabled to inspect the works laboratory and calorimeter room, and other ancillary plant, passing on to the cooker and fire renovation shops, and finally to the magnificent gas showrooms. These showrooms, which were fully described and illustrated in the "JOURNAL" immediately following their official opening last October, are undoubtedly among the finest of their kind in the country, providing ample accommodation for appliance displays on the ground floor and basement, with lecture room on the first floor and two floors of offices to let above. Offices for the staff are provided in the rear.

Guests of the Company at Luncheon.

Following the inspection of the showrooms, the members were rejoined by the ladies and were the guests of the Luton Gas Company at luncheon at the George Hotel, the Chairman of Directors (Mr. R. E. Tomson) presiding, being supported by Mr. H. H. Cooke, Mr. W. W. Merchant, and Mr. D. Seebohm (Directors), and Mr. W. Phillips (Engineer, General Manager, and Secretary).

The Loyal Toast having been duly honoured, the CHAIRMAN offered a hearty welcome to the Association, and said how proud the Luton Company were that they should have chosen a member of the staff to be their President. In that Hotel, 103 years ago, said the Chairman, the Luton Gas Company was started; four gentlemen met together and decided to found the Company—which had been flourishing ever since. To-day Luton had the lowest unemployment figure in the country, and they were proud to say they had some fine works and were a very prosperous place, which condition was reflected in the Gas Company. But it meant a great deal of work for them, too, for they were always having to put up new plant to cope with the increasing demand for gas.

The toast of "The London and Southern District Junior Gas Association" was submitted by Mr. W. PHILLIPS, who fully endorsed the welcome already expressed by the Chairman.

Mr. SUMMERSON, in acknowledging the toast, said how very much the members and their ladies appreciated the invitation of the Luton Gas Company. Their appreciation was indicated by the large number present, and he would like to express his personal thanks as well as the thanks of the Association to the Chairman and Directors of the Company for inviting them and for their generous hospitality. He also voiced his deep appreciation of the keen interest of Mr. Phillips in the work of the Association; Mr. Phillips had supported him in every way possible during his year of office, and the success of that day's visit was in no small measure due to his determination that no detail which might contribute to their interest and enjoyment should be overlooked. The Association had a great friend in Mr. Phillips, and Mr. Summerson would always remember with gratitude his interest and support in his work as President.

The President went on to say that he was very glad the members had had that opportunity of seeing something of the works and showrooms of the Luton Gas Company; he was perfectly certain they had seen many things of which they fully approved. He was equally certain that they had seen some things of which they disapproved; therein lay the value of such visits to members of the Association, because at every works which they visited they were able to study not only how things ought to be done, but also how they might be done better. Such visits were a perpetual incentive to them to strive for greater technical and commercial perfection, and for the greater success of the Industry. If they had learned something of use—if they had gained some inspiration by their visit to Luton that day—then his Directors and Mr. Phillips were very gratified. In conclusion he thanked his Directors and his Chief for their presence there on that occasion.

The Toast of the Gas Company.

The toast of "The Luton Gas Company" was proposed by Mr. R. N. LEFEVRE (Senior Vice-President), who referred to the fact that forty-eight hours before he was in Paris as one of the British delegation to the Congress of the International Gas Union, attended by representatives from practically every country in the world having a Gas Industry. He had been particularly struck by the high regard which every other nation had for this country—not only for their Gas Industry, but for the country as a whole—their politics, their resources, and their progress. Nor was he exaggerating when he suggested that their success had been established by the efforts of their industrial towns, of which Luton was possibly the foremost, in typifying all that was best in the British character. "Made in Luton" meant well-made, said Mr. LeFevre; and those of them wno had been fortunate enough to visit the hat factory that morning had had ample evidence of the reason why Luton held second place to nowhere for the production of hats. He was sure the ladies would wish him to say how grateful they were to Messrs. Sunman & Hewson, and Messrs. Currant & Creak for their courtesy and for making the visits possible.

The real success of Luton, however, was, of course, due in no small measure to the fact that its manufacturers had been quick to appreciate the value to them in their work of the best possible fuel; and whether it was for making hats, motor-cars, or any other of the thousand-and-one different articles produced in Luton, gas had been proved the ideal fuel for the many and varied heating processes involved. The prosperity of the town was thus not unconnected with the untiring efforts and progressive policy of the management of the Luton Gas Company, whose Chairman they were so delighted to have with them on that occasion. The Luton Gas Company, went on Mr. LeFevre, also occupied a position of the highest esteem in the Gas Industry; it had, he believed he was right in saying, the highest consumption per consumer of all the gas undertakings in the country, and for the first five months of the present year it had had an increase in output over the corresponding period of the previous year of as much as 7·6%. In spite of the fact that the Company sold so much of its gas for industrial purposes at low price rates, it was able to sell gas to domestic consumers at the remarkably low price of 8d. per therm. The efficiency of a gas undertaking ultimately stood or fell by the effort and ability of its manager, and the record of Luton to which he had just referred was ample testimony of the ability of its Engineer, General Manager, and Secretary, Mr. W. Phillips. The Luton Gas Company owed a great deal to Mr. Phillips—and not only to him but to his family, since he was third generation to occupy the position of General Manager of the Company. And it was gratifying to know that there was a fourth generation in Mr. Phillips' son, Mr. W. G. Phillips, who was carrying on the tradition of his family by adopting a career of service to the Gas Industry and the community.

In addition, their thanks were due to the guides, Mr. J. Summerson, Mr. J. A. Day, Mr. R. Ruggles, and Mr. W. Simpson for the efficient manner in which they had conducted them round the works.

The toast was cordially accepted and was duly acknowledged by Mr. TOMSON.

A Visit to Whipsnade.

In the afternoon the visitors bade adieu to Luton with many expressions of appreciation of a most interesting visit and of the generous hospitality of the Gas Company—and set out for Whipsnade Zoo, a tour of which had been arranged for the afternoon. The Park covers an area of 500 acres at an elevation of 600-700 ft., and its inspection brought to a close a day which will long be remembered by the "London Juniors."

Manchester and District Juniors

A group of Members and their ladies at the Warrington Works of Richmonds Gas Stove Co., Ltd.

Visit to Gas Stove Works

On June 16 members of the Manchester and District Junior Gas Association paid a visit to Richmonds Gas Stove Company, Ltd. (Radiation Ltd.), Grappenhall Works, Warrington. The occasion was regarded by the Association as a special one, being their Annual Ladies' Day, and the party of 100 included many ladies who shared in the close interest displayed in an examination of the numerous manufacturing processes of Richmonds' modern plant.

Richmonds Gas Stove Company, Ltd., was established at Warrington 47 years ago and a tour of the present large factory, which is situated on the banks of the Manchester Ship Canal, is always of interest.

The foundry is numbered among the largest light casting foundries in the north, and to see the work in progress is always a fascinating experience. The multiplicity of castings are passed from the foundry to the dressing shops where they are cleaned and examined before being transferred to the castings stores where they are classified and temporarily stored ready for speedy distribution to the departments needing them.

In the machine shops rows of drilling and tapping machines were seen dealing with thousands of components. In an adjacent shop it was explained how machine tools are made and kept in condition for pressing the numerous sheet-metal components of gas appliances.

The sand blasting department, where castings are treated for enamelling, created much interest. The visitors were taken to the extensive enamelling departments where much time was spent examining the mixing of the enamelling ingredients, the preparation of the liquid enamel, the mottling, and the subsequent firing of castings and sheet-metal parts in large muffling furnaces.

Each party was conducted through the chromium-plating shops and on to the Department where the "Regulo" automatic oven heat controller is assembled, set, and tested.

The visitors were next conducted through the assembly and fitting shops, to which a constant stream of finished components of all kinds flows from every other section of the works. Castings, cooker bases, tops, door frames, enamelled sheets, burner bars, "Rado" boiling burners, brass parts, "Regulo" oven heat controllers, oven burners, shelves, and so on, coming through at an orderly rate to the points where all sizes of "New World" cookers for domestic use and also double and treble oven ranges for hotels and restaurants are built and finished. To the fitting shops also come gas fire castings, fire bricks, burners, radiants, taps, &c., for the construction of High "Beam" gas fires, and the process whereby these fires receive their beautiful lustre coloured finishes was also watched with considerable interest. In addition to cookers and fires, the visitors also saw radiators, gas irons, and many other gas appliances take shape. The party also visited the departments devoted to the production of water heating equipment.

At the conclusion of the tour of the works Mr. T. CALDWELL (President of the Association) said he would like to express to Messrs. Richmonds, and particularly to Mr. Poole and the people who had assisted him in making the visit such a success, a hearty vote of thanks for the facilities granted in showing the members round the very interesting and modern works, and also for the hospitality extended to them. He felt sure the ladies had been particularly interested in the manufacture of cookers, and all the other appliances which went to make the hub of the home. Mr. Caldwell took the opportunity of thanking the officers and members of the Association for their wholehearted support during his year of office. He was very gratified at the success attending it, which he attributed to the splendid spirit and good-fellowship existing among the Manchester Juniors. He also mentioned that the Past-Presidents intend making a presentation of a very fine medallion, which would be worn by future Presidents.

Mr. J. GRAHAM (Lancaster), in seconding the vote of thanks, remarked that a visit to Richmonds was always appreciated, and they would look forward with pleasure to returning at some future date. He would like to assure Mr. Poole and the Directors that the members had had a very enjoyable afternoon.

Mr. ROBERT POOLE (General Manager, Warrington), in responding, thanked Mr. Caldwell and Mr. Graham for their remarks. He said that the Company were honoured that their works had been chosen for the Ladies' Day visit. He felt sure that such visits were of mutual benefit in enabling them to appreciate each other's point of view. Mr. Poole read a telegram from Mr. H. M. Thornton (Chairman of the Richmond Company), conveying to the President and members of the Association best wishes for an enjoyable afternoon.

Athletic and Social

South Metropolitan Sports.

The South Metropolitan Gas Company are holding their annual athletic sports at East Greenwich on Saturday, June 26.

Ascot's Annual Outing.

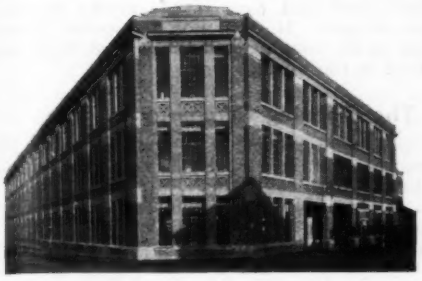
A large party of members of the staff of Ascot Gas Water Heaters, Ltd., and their ladies took part in the firm's annual outing on June 12. The venue was Herne Bay, which was reached by boat from London. Dr. Bernard Friedman (Chairman of Directors), Mr. Leopold Friedman (Technical Manager), and other senior officers accompanied the party, and a most enjoyable day was spent by the sea.

A Successful Season.

A Football Club formed by the Officials and Employees of Stoves, Ltd., Rainhill, had a very successful first season 1986-7. Two teams were chosen and the trophies won included the Hall-Walker Cup, the Liverpool Association Cup and Medals, and 12 miniature cups from the Whiston Cup Competition. A wag has suggested that at this rate of progress the English Amateur Cup Competition may be worth considering. Apparently the football teams have been inspired by the rapid progress of the firm.

FINE NEW QUARTERS

for



Birmingham's Fittings Section

Official Opening of

Offices, Stores, and Workshops in Lord Street

by the

World's Largest Municipal Gas Undertaking

Birmingham, with its million inhabitants and great variety of trades, offers a wide field for the use of gas, and this fact has been fully appreciated by the Birmingham Gas Committee, and through the efforts of its sales organization the Department's output of gas is increasing yearly. In the twelve months ended March 31, 1936, the total sale of gas was a record in the history of the Undertaking, being 15,419,834,400 cu.ft., equivalent to 6·76% over the previous year, which was also in itself a record. Of the quantity of gas consumed in the year ended March, 1936, it is estimated that no less than 30% was used for manufacturing purposes.

The Undertaking to-day supplies gas for a variety of uses to over 324,000 consumers, situated in an area of approximately 200 square miles, and at the present time there are approximately 330,000 meters, 322,000 cookers, 170,000 gas fires, and many thousands of hot water appliances in the area of supply.

The numerous units which compose the Fittings Section have in the past, owing to lack of accommodation, been housed in various parts of the city, but in 1930 the Gas Committee decided that with a view to economy of working, and to render more efficient service to consumers, the whole of the Section as far as possible should be accommodated under one roof. For this purpose, adjacent to stores erected in 1928, new offices, workshops, and stores, designed by Mr. J. Alfred Harper and Mr. W. Geoffrey Harper, of the firm of Messrs. Ewen Harper, Brother, & Co., Architects, of Birmingham, have been erected on land, the property of the Department, adjoining Windsor Street Gas-Works, the main entrance being in Lord Street.

The City Council approved the scheme in July, 1930, and the sanction of the Ministry of Health for the borrowing of the required capital was given on June 15, 1931, but owing to the fact that it was necessary to carry out the contract in two parts, with an interval to allow the several departments to transfer from old buildings to be demolished into the first section of the new building, it was not until August, 1936, that it was found possible to unite completely the various staffs for which the buildings were designed.

The buildings are erected on a site of approximately 2¼ acres, which had previously been occupied by seven gasholders, and owing to this fact it was decided to construct the foundations with reinforced concrete piles. These reach to an average depth of 30 ft. from ground level, and, where necessary, were actually driven through the old concrete beds.

The superstructure is of steel framed fire-resisting construction with elevations of a simple modern style, special attention being given to the provision of adequate light and ventilation; based on modern standards it can be said that excellence in this respect has been reached. The floors are of reinforced concrete with a double thickness wood paving of patent construction, the surface being of Jarrah. Two passenger lifts and four large goods lifts serve all floors, and there are several staircases giving easy communication between departments and ready escape in case of fire. Each section has ample up-to-date lavatory accommodation with tiled floors and walls, and a gas generated hot water service.

The total superficial floor area of the new premises (including the section erected in 1928) is 170,000 sq.ft., and the amount of the various contracts will total approximately £190,000. The General Contractors were Messrs. Maddocks & Walford, of Birmingham. The steelwork was supplied and erected by Messrs. Rubery, Owen, & Co., of Darlaston, and the pile foundations were carried out by Messrs. A. Jackaman & Son, Ltd., of Slough.

The aerial and other photographs reproduced here give some indication of the spacious accommodation which has been provided, the details of which are as follows:

Windsor Street Block.

On the left of the gateway entrance there is the Fitters' Assembly Hall together with District Inspectors' Office. Parallel with Windsor Street is the General Fitting Stores, with centrally situated loading deck, from which the whole of the materials used in the Section and the various depôts are supplied.

In the basement below there is a bulk store, and space is used for the preparation of materials prior to delivery to consumers' premises.

The first floor of this block comprises administrative offices, Conference Hall for demonstrations and lectures, and offices for the Maintenance Section. The Department undertakes the repair and maintenance of apparatus fixed in consumers' premises, and this service is increasing the amount of repair and renovation work which is being carried out at the Lord Street premises. On this floor are situated also the messrooms for fitters and storesmen.

The Distribution Section is housed on the second floor. The accommodation includes well-appointed drawing offices and offices for the clerical staff. At the present time the Department has laid within its limits approximately 1,800 miles of mains. On the same floor the New Buildings Section is situated. The activities of this Section cover the examination of all new premises erected in the Department's gas supply area and the preparation of specifications for the fitting up of such premises with internal pipes. The Section is responsible for keeping in close touch with builders and architects with a view to advising them on matters appertaining to the fitting up of premises for the use of gas-consuming apparatus. As a result of this Section's efforts it has been possible to agree with builders

Cooker Repair Shops

Main Fittings Stores

and architects a standard specification for gas fitting work on Municipal and private estates.

Staff messrooms, kitchen, and reading rooms also occupy space on this floor.

Lord Street Block.

The basement, which runs the full length of this block, is used for the storage of meters, cookers, and materials, and on the ground floor are receiving stores and despatching decks.

On the south side of the courtyard there are fittings workshops, where the preparation of materials and the repair of outside lamps are carried out. On the east side are the repair shops for large cylindrical meters, and the meter testing station which is under the control of the City Justices. This latter station is solely occupied in the testing and stamping of the meters made and repaired by the Department at Lord Street. Situated on the first floor of this block are gas fire stores, cooker repairing shops, and a section where a paint-spraying plant has been installed for the colouring of gas fires and also for the black spraying of cookers and components. Over 8,000 gas fires were coloured by this process during the last twelve months. A testing room is provided, through which all meters made or repaired by the Department are passed prior to certification and stamping by the City Justices' testers. On this floor also is situated a canteen for the use of manual employees.

Separated from the main block of buildings on the east side, but connected by a corridor, there is a specially constructed bosh house, where all cookers on hire are periodically cleansed before being passed forward to the cooker repair shops for overhaul. The cleaning medium for these cookers is a hot solution of caustic soda, and special tackle has been provided for lifting the cookers into and removing them from the various washing tanks. In the basement of the bosh house is a central heating plant for the whole block of buildings.

A section of the new Lord Street premises has been set aside for the testing of gas appliances. No new type of apparatus is purchased by the Department unless it has been carefully examined in this laboratory.

With the large number of workers employed in the new buildings accidents unfortunately occur, though many of them are of a minor character. In order that immediate treatment should be available, an ambulance room constructed on the most modern hygienic lines has been established, with waiting and dressing rooms. A full-time attendant, trained in ambulance duties, is in charge of this station.

The foregoing brief description indicates some of the activities which are taking place at the new Lord Street depôt and the demands which are being made by its consumers on the Birmingham Gas Department. Over sixty years have elapsed since the Undertaking was first acquired by the city, and since that time it has grown approximately six times in size. It is to-day the second largest Gas Undertaking in the country and the largest municipal concern of its kind in the world.

The Opening Ceremony.

Some 230 persons were present at the opening ceremony of the new premises on June 14, when a thorough tour of inspection of the building was made.

Councillor A. S. Giles, M.C. (Chairman of the Gas Committee), welcomed the visitors and referred in some detail to the work which would be carried out in the new building. He also paid tribute to the many years of service given to the Gas Committee by Aldermen Lloyd and Williams.

In responding, Alderman Williams mentioned the assistance rendered some ten years ago by Mr. R. J. Rogers in connection with the decision to utilize the present site.

The Lord Mayor of Birmingham (Alderman Harold Roberts) thereafter formally declared the new premises open, dedicating the building to the service of the people of the City. To mark the occasion, he was presented with a gold key by the architects, and in conclusion tributes were paid to the latter and also to the builders.

PARTICULARS RELATING TO WORK PASSING THROUGH THE SHOPS AND STORES AT LORD STREET DURING THE COURSE OF 12 MONTHS.

Meters reconditioned	21,000
Cookers, fires, and other apparatus reconditioned	20,000
New domestic appliances of various kinds tested for accuracy and safety	37,000
Prepayment and ordinary meters made to the department's own designs	2,800
Prepayment and ordinary meters issued from the stores	40,000
Prepayment and ordinary meters returned from consumers' premises for repair and renovation	30,000
New meters received and handled from manufacturers	15,000
Permanent hire fires and hire purchase fires, radiators, boilers, cookers, and geysers, and sale outright fires, boilers, cookers, &c., issued from Lord Street	31,000
Prepayment and permanent hire cookers sent out	18,000
Prepayment and permanent hire cookers, &c., returned for repair and renovation	20,000
Appliances received in and issued from the stores	79,000
Parts issued from the depot for repair and renovation, and maintenance of different gas appliances	220,000

Gas Undertakings' Results

Elgin.

In his annual manufacturing report the Engineer of the Elgin Gas Department states that the total gas made was 127,772,000 cu.ft.—an increase of 5,629,800 cu.ft. over last year—and that the increase in gas consumed was 8,500,000, so that by relaying faulty mains and re-servicing, the unaccounted-for gas would be reduced by approximately 2½% to about 5%.

Holyhead and North Wales.

The gas sold by the Holyhead and North Wales Gas and Water Corporation, Ltd., for the year ended March 31, 1937, shows an increase of 1,544,900 cu.ft. The net profit for the year is £4,558, and the Directors recommend that a dividend at the rate of 4½%, less tax, be paid for the year ended March 31, 1937, and that the sum of £1,000 be transferred from profit and loss account to reserve fund account.

Kilsyth.

The Municipal Gas-Works at Kilsyth have had a good year, the consumption of gas amounting to 84,923,000 cu.ft., thus establishing a record, being 8½% ahead of any previous year, while the output during the past fifteen years has been doubled. Although the increase in the price of coal, &c., is equivalent to an increase of 17% in the price of gas, the Town Council have decided to leave the price of gas unchanged for the current year.

Macclesfield.

The Macclesfield Corporation Gas Department has had another very successful year, although the net profit is much below what it was in the previous twelve months. There has, however, been an increase in the sale of gas, while the amount given back to consumers in the way of rebates is almost £600 greater. The net profit for the year amounts to £2,878 as against £5,170 in 1936. Chief among the causes for the drop in revenue were the erection of a new condenser at a cost of about £1,400, the laying of additional mains to meet the needs of new houses, advance of about £300 in wages, and increase in the price of coal for one period by 1s. per ton and other items. The sales of gas advanced during the year by 37,000 therms, or a 2% increase. The sum of £55,053 was received from the sale of gas, but £15,653 was returned to consumers in rebates.

Middlesbrough.

The Middlesbrough Corporation Gas Undertaking earned a net surplus last year of £19,569 compared with £15,460 the year before, an increase of £4,109. The revenue from the sale of gas was £135,026 compared with £129,633. The gross profit was £43,772. Expenditure also increased by £3,818. Gas purchased amounted to 1,311,785,000 cu.ft., while the number of consumers were 36,869.

Stourbridge.

The quantity of gas sold by the Stourbridge Gas Department during the year has increased by 25,699,100 cu.ft., equal to over 6½%, and the receipts for gas, together with residuals, show an increase of £6,800. The profit on revenue account is £17,659, as compared with £15,657, which is satisfactory, considering that in addition to coal, the cost of all raw materials has been considerably advanced. The expenditure on mains has been unusually heavy in order to give supplies to the new housing schemes and general building, which has been quite brisk. The usual proportion taken for relief of rates would be £2,506, but as the figure taken in the budget was £2,700, the shortage of £193 will be taken from the equalization fund, after which the balance on that fund will be £3,309. The whole of the works and plant has been maintained in a state of efficiency during the period under review; the new vertical retort installation continues to work satisfactorily, and the new gasholder was put into commission by the Chairman of the Gas Committee, in the presence of the Town Council, on Oct. 19, 1936.

Scientia Industriæ Decus et Tutamen

Fundamentals of the Combustion Process

[Contributed]

The parable of the building on the sand and the building on the rock is of universal application. In view of the present activities of the Gas Industry and of its future the parable may be appropriately applied to it.

To consolidate our position, we are told, the Gas Industry to-day must concentrate with unabated vigour upon the sale of gas appliances. It is not the intention of the writer to contest this view, but the question does arise—will this in the long run secure for our business that stability for which it looks? It has been said that "asking a question is nine-tenths the answer." The writer is aware that much has been done and is being done to produce better gas-consuming appliances of higher thermal efficiency, but the real point to be considered is, what is the Industry doing to place the combustion process itself on a sound, satisfactory, and scientific basis, for that is the bedrock of our business.

One cannot help thinking that were the fundamental principles of gas burner design and the mechanism of combustion re-examined and subjected to exhaustive investigation by, say, half-a-dozen enthusiasts of the younger generation—men of the stamp of Dixon, Smithells, Bone, and Wheeler—some useful discoveries might be made that would go a long way to secure the future for gas in the domestic field. Work of this character might have very far-reaching results, and to dig beneath the surface of things in this important field of research is surely a logical procedure fully justified by the requirements of to-day. The reward of well-directed work of this kind might be out of all proportion to its cost.

The superficial impregnation of a porous clay disc with suitable activating chemical gives rise to interesting combustion phenomena. This, of course, is well known, but the use of catalysts to promote combustion, so far as the writer knows, has not been carefully and exhaustively examined in relation to its application to domestic gas-consuming appliances. One recalls the words of Prof. Smithells, "The more closely we scrutinize combustion, the more impressed must we be with what remains unknown." It would be of considerable value if the Gas Industry could have a clear and concise résumé of all the relevant information relating to gas combustion.

There is now an urgency for progress, expectancy, and faith in the value of science in making discovery. In technology, so far as it is the application of scientific discoveries, there is bound to be some time interval between the establishment of a principle and its useful application, and that is all the more reason why no time should now be lost in getting down to the job, but the work must be directed to practical ends, for that is all-important. Valuable time can easily be wasted by a too academic handling of the problem. In this matter science and practice must go hand in hand. That is the crux of the matter.

There is much that one could write in support of investigatory work of this kind. The history of the useful arts and applied sciences provides ample evidence, if evidence is needed, and the history of the Gas Industry itself has demonstrated that properly directed research has had far-reaching effects. The value of a principle in the matter of its potential application has not always been recognized at first, but once it has been realized it has applications progress has usually been rapid. In the future, conceivably, there will be employed in useful combination those sources of energy which are now available to the community and which, when judiciously and properly harnessed together, may best serve the home.

We must not place so much reliance on the uncertain sand of modern commercial practices as to neglect the firmer ground. It may be thought there is nothing new to be discovered, but "there are more things in Heaven and earth than are dreamt of in our philosophy." This has been demonstrated time and again in the history of the Industry, and was demonstrated by the Austrian chemist who some fifty years ago indicated possibilities that gave new life to the Gas Industry.

Mr. E. V. Evans, Chairman of the Joint Committee of The Institution of Gas Engineers and the University of Leeds, commenting on Mr. Masterman's Paper, foreshadowed "interesting developments in the matter of combustion characteristics of gas." It may be that the work which is now being carried out at Leeds under the direction of Mr. E. V. Evans and his Committee deals with such problems as have been referred to in this communication. At any rate, we look forward with expectancy to the information which will be disclosed at the November Conference of this year.

In This Week's "JOURNAL" - - -

Coke Salesmen's Circle at Ipswich.

Members of the London and Counties Coke Salesmen's Circle, under the Chairmanship of Mr. J. Grayston, of Romford, spent a most interesting afternoon inspecting the works of Messrs. Crane, Ltd., at Ipswich, where they saw every process in the production of the firm's boilers and radiators and malleable iron fittings, afterwards being entertained at tea by the firm.

See p. 935.

The Waverley Meeting.

The Annual Meeting of the Waverley Association of Gas Managers was held in Edinburgh on Thursday and Friday of last week, when a large number of members from all parts of Scotland gathered to do honour to Mr. W. B. McLusky, who returned to take the Presidential Chair again after an interval of 37 years. It is particularly appropriate that the members of the world's oldest Gas Association should have chosen this year to recall Mr. McLusky, for it marks the completion of a quarter of a century's service as Engineer and Manager of the Halifax Corporation Gas Department. His Presidential Address contained much of interest, but the section which stimulated the greatest interest was that dealing with rate structures, on which subject Mr. McLusky is, of course, an acknowledged expert—and a lively discussion followed in the course of which several members gave their views and experiences of various systems of charge. At the luncheon, which followed at the North British Station Hotel, many well-deserved tributes were paid to a popular President, while a further plea was made for the Association to abandon its position of isolation and affiliate with The Institution of Gas Engineers.

See p. 928.

International Gas Union.

Paris entertained, from June 12 to 16, a large concourse of nearly 700 gas men and ladies for the Third International Congress. The very representative delegation from this country, organized by The Institution of Gas Engineers and led by the President, Mr. Harold C. Smith, numbered 65 ; and in magnificent weather they spent a profitable and enjoyable time. From our own correspondent's diary and a selection of his many photographs, it should not be inferred that there was no Conference. The reports and papers will be dealt with separately.

See pp. 920-923.

Customer Service.

At the Conference Mr. R. N. LeFevre presented a Paper on Customer Service largely on the lines of his contribution at the Annual Meeting of The Institution of Gas Engineers, in which he gave details of the Gas Light and Coke Company's training scheme at Watson House. In his Conference Paper, Mr. LeFevre included examples indicating the degree of cutsomer service offered and the work in connection with testing and training now being done in Great Britain, Germany, and the United States of America. "The real backbone of customer service," he said, "is the training of the personnel. Here we have two schools of thought, the companies who believe that every service man should be able to deal with every job as against the theory that specialists should be employed for such things as refrigerator and house-heating work. Probably the answer is that it depends upon the size of the company and that large companies do best with specialists and the small with the all-round workmen. Whichever system is employed, it is essential that a foreman or specialist attend to every call made for the third time within a three-month interval."

See p. 924.

London Juniors at Luton.

For their summer visit and ladies' day this year the London and Southern District Junior Gas Association were the guests of their President's Company at Luton. While the members were viewing the works and showrooms, the ladies spent an interesting morning inspecting hat factories, and after luncheon at the kind invitation of the Luton Gas Company the remainder of the afternoon was spent at the Whipsnade Zoo.

See p. 915.

Manchester Juniors' Summer Visit.

A most enjoyable day was spent by the Manchester and District Junior Gas Association on June 16, when, in company with their ladies, they were the guests of Richmonds Gas Stove Co., Ltd., at the latter's Warrington Works.

See p. 916.

Middlesbrough Gas-Works.

Details of the works of the Middlesbrough Gas-Work were given by Mr. J. W. Pallister in his Address as Chairman of the Auxiliary Section of the North of England Gas Managers' Association. The results at Middlesbrough, he maintains, have been a striking example of the success of a scheme for the utilization of coke oven gas. The record of interruptions in the supply, however, demonstrates the necessity for the provision of ample stand-by plant.

See p. 938.

South-Eastern Offer to North Middlesex.

An offer has been made by the South-Eastern Gas Corporation to acquire a controlling interest in the North Middlesex Gas Company. The terms are published.

See p. 927.

INTERNATIONAL GAS UNION

A World-Wide Gathering of Gas Men

Third International Gas Conference

Held in Paris, June 12-16

The Third International Gas Conference was held in Paris from June 12 to 16, under the Presidency of Monsieur A. Baril, Assistant General Manager of the Société d'Eclairage, Chauffage, et Force Motrice—the undertaking which supplies gas in the outer suburban circle of Paris.

It was an impressive gathering of gas men from all parts of the world. There were nearly 700 registrations for the Congress—approximately 540 men and 160 ladies. Of the former, by far the largest contingent was naturally French—about 365; British Empire next with 44; then Germany with over 30 delegates. Belgium, Switzerland, and Czecho-Slovakia had each about 20 representatives, leaving 35 to 40 for the many other European States. Major Alexander Forward was warmly welcomed as envoy extraordinary from America. A note of the Reports and Papers to be presented was given on page 789 of the "JOURNAL" for June 9, and abstracts of these are to appear on other pages of this and future issues. Here we present a brief diary of the proceedings as a whole.

British Delegation.

To the list of delegates which we published on June 9 were added the late registrations of Messrs. L. C. H. Athill, P. Hulme Hornby, and Herbert Moys, so that the total number who assembled under the leadership of Mr. Harold C. Smith, President of the Institution, was 65 (all regretted the last-minute inability of Dr. Friedman to attend the meetings). The party was truly representative of our Industry—Councillors, Directors, Engineers and Secretaries, H.Q. staff, manufacturers, and (may we add) journalists—and we were proud to have with us men with such distant connections as Messrs. C. F. Broadhead, J. W. Brown, and Bernard Browne. The British headquarters was the Hotel Continental; and all had assembled by Sunday morning, the large Gas Light and Coke Company delegation travelling by night after the Company's Sports.

Presidential Address.

The business sessions were held at the Headquarters of the Société des Anciens Elèves des Ecoles Nationales d'Arts et Métiers, Avenue d'Iéna, and there was a very packed audience for the opening session on the Saturday afternoon. After welcoming the delegates from all countries, M. Baril delivered a short Presidential Address, in which he stressed the complete confidence which the Gas Industry in every country had always placed in scientific research. Certain economists believed, he said, that scientific progress meant less employment. But he did not agree, and based his personal opinion upon a review of the past 50 years. In 1935 labour costs, on a properly comparable money basis, had risen by 1,450% over 1885; sales of gas by volume, on the other hand, had only increased by 277%. Salaries during the same period, valued in Poincaré francs, had risen 70%. Hence he deduced the fact that the number of men occupied in making a like volume of gas had risen in the proportion of 1 to 2·8. Therefore what had been done, at the behest of undertakings anxious to lower their cost prices, by technicians and men of science—that is to say, by brain workers—had prevented neither an increase in the cost of labour nor an increase in the actual number of workers. In short, it was for the benefit of manual labour that brain work had been expended. In those 50 years, the selling price of gas had dropped by 40%, while the cost of the personnel had increased by 70%. Between the two, undertakings had made, for the sake of technical progress, an enormous financial effort without compensation of any sort for themselves. It was essential, said M. Baril in conclusion, that all those engaged in gas production should collaborate to right this situation. If it continued, gas, facing stern competition in all its applications and enjoying no monopoly, would be in jeopardy.

M. Baril next announced, amid applause, that the Council had designated Herr Hermann Müller, of Dessau, as the next President. In thanking the delegates, Herr Müller referred to the great work M. Baril had done for the Union, and he proposed that he should be elected Honorary President. This was greeted with enthusiasm, as also was Herr Müller's reference to the sterling work done by M. Pierre Mougin as Secretary.

Greetings from America.

M. Mougin then read a message from Mr. Clifford E. Paige, Vice-President of the Brooklyn Union Gas Company, in which he said he was especially sorry that circumstances prevented his being present on this, the third time, that their great industry had met internationally. Perhaps never before had so many vital problems beset the gas business; but they would, as in the past, find a solution for them and so raise the industry to new heights and new attainment. Gas was alive and vibrant with accomplishment. As an example, his Company showed in the first four months of 1937 a gain over 1936 of 32% in appliances sold. In 1936 the gain over 1935 was as great. And modern appliances were so much more efficient than old equipment that sales did not gain so rapidly; but the security of future business and resistance to competition was assured. Major Alexander Forward was conveying his (Mr. Paige's) greetings and his best wishes to the International Gas Union.

The afternoon session was concluded by a lecture on "Atomism in Modern Physics," by Prof. Louis de Broglié, Nobel Prizewinner. Thereafter the delegates were conveyed to the Cité Universitaire, where they were joined for

Monsieur A. Baril.

tea (and/or champagne) by the ladies, who meantime had been visiting Notre Dame and the Sainte Chapelle.

Sunday, June 13.

During the morning the Gennevilliers Gas-Works of the Sté. E.C.F.M. were open to the delegates. These works, which cover an area of over 200 acres, and have an output of about 35 million cu.ft. per day, supply 135 districts of the Paris region through a distributing system nearly 2,800 miles in length. They are equipped with coke ovens, inclined chamber ovens, and Woodall-Duckham ovens, and possess a water-gas plant operating entirely automatically with a capacity of 14·5 millions a day.

For the ladies there was a call at a thermal establishment at Enghien, and luncheon was served to the multitude on the sun terrace of the Enghien Casino. All marvelled at the excellence of the déjeuner and the efficiency of the service. Afterwards there were visits to the 16th century Castle of Méry and the Abbey of Royaumont.

Technical Visits.

One Report and the Papers by Prof. Dr. Bunte and M. Bazille were presented on Monday morning, and for the

Sir Russell Bencraft, Sir Albert Ball, Mr. and Mrs. Whitehead in the Avenue d'Iéna.

afternoon there had been arranged a selection of visits. The Société du Gaz de Paris opened their laboratories and the Cornillon Gas-Works to visitors. The Laboratory for Testing Appliances is one of the three laboratories entrusted, by the Association Technique de l'Industrie du Gaz en France, with the examination of gas-using appliances submitted for stamping. The Experimental Works and Laboratories at La Villette (Chemical and Physical Research, and Industrial Laboratory) constitute research centres for the Company, and their installations, especially

Outside the Enghien Casino.

for studying high temperatures and calorimetric measurements, are among the most modern in existence.

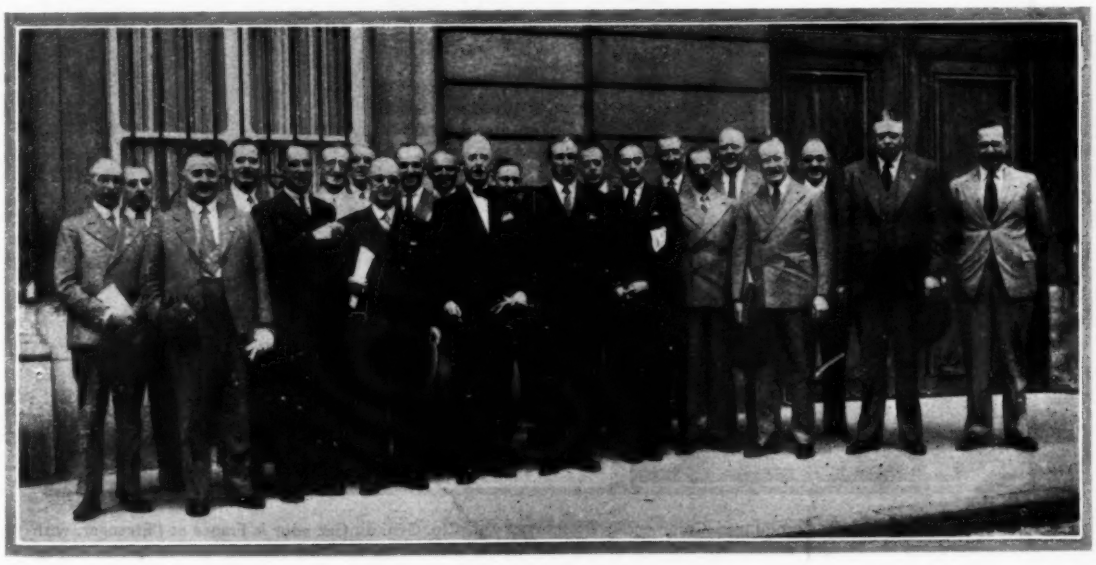
The Cornillon Works, the newest of the Company, cover an area of about 125 acres and produce about 5 million cu.ft. per day in inclined chamber ovens.

A further alternative visit was to the workshops of the Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz, which employ about 4,000 men in the manufacture of gas meters and other appliances. French television and telecinema had their inception in these workshops, and experiments in this new technique were shown.

The Exhibition.

Still another party visited technical sections of the Exhibition, and felt the keenest sympathy with their French colleagues because labour troubles had prevented a great industrial enterprise from being completed at its due date for the world to view. The German Eagle faced the Hammer and Sickle across the main avenue of the Exhibition, and the Italian Pavilion was finished; but many others, including the British, were far from complete. The writer of this diary formed the same opinion of the French Gas Pavilion, which he attempted, unsuccessfully, to gate-crash while preparations were forward for the banquet; but the following description from the programme of the Congress shows that the French Gas Industry has gone out for a worthy display.

The Pavilion stands on the left bank of the Seine, close



After the British Session.

to the Pont des Invalides, at the angle of the Quai d'Orsay and the Boulevard de la Tour-Maubourg. It was designed by M. Madeline, Professor at the Ecole des Beaux Arts and Conservator of the Grand Palais, and consists of two floors, one of which extends out over the Seine. The general design is modern, although it does not lack a cer-

De-Dusting near the Exhibition.

tain classic style, which makes an elegant and harmonious whole. The interior has been conceived on a general plan which excludes individual stands, but presents instead each object and each appliance in a stylish setting. For example, all the water-heating appliances (geysers, hot water appliances, &c.) are assembled on the ground floor in the midst of playing fountains which disappear in a cascade into the Seine; the cooking appliances are grouped on the first floor, while the commercial or industrial appliances are shown working on the floor above, with experts constantly in attendance for demonstration purposes.

The restaurant kitchen will be open for inspection, while the restaurant itself will certainly be one of the most sought-after places in the Exhibition, by reason of its pleasant situation and the excellence of its cooking. There will also be a bar on the ground floor. There is a conference hall, capable of seating one hundred persons, and a programme of demonstrations, conferences, and films has been arranged.

Official Banquet.

However unfinished the Exhibition, the master who ruled in the kitchen of the Gas Pavilion on the Monday evening knew how to produce and serve a banquet, complete enough for any gastronomic expert.

At the high table with M. Baril were representatives of the Home Office and the Education Department, the President of the Union of Chambers of Commerce, and other officials; Hon. Pres. Escher and Herr Müller; Mr. C. Valon Bennett and Mr. Alexander, Council Members of the Union; and Past-Presidents of the French Organizations. Also the only official lady delegate, Mlle. J. Czaplicka, Engineer at Cracow, who, we are gratified to understand, keeps her perfect English sharp upon the grindstone of a weekly "Gas Journal."

M. Baril gave the toast of the heads of the many States represented; and short speeches followed from Herr Müller, M. A. Bazille (President of the Association Technique), and M. Marcel Lebon (President of the Union Syndicale de l'Industrie du Gaz en France).

Versailles and the Louvre.

All this time the ladies had been enjoying a special programme of their own—in the afternoon a visit to the

Top right: M. Bertrand de Comminges, Commercial Director of the Cie. Gén. du Gaz pour la France et l'Etranger, with Mr. LeFevre and Mr. Flavel. *Bottom left:* Mr. Lacey and Mr. Atthill, with M. Louis, Chief Engineer of the Sté. du Gaz de Paris. *Bottom right:* Mr. H. C. Smith (President of the Institution and Leader of the Delegation), with the readers of British Papers and British Members of the Union Council.

Château, the Grand and the Petit Trianon at Versailles, with tea in the Trianon Palace. In the evening they were shown the Louvre, sections of which have lately been subject to structural alterations and redecoration. And we are assured that the modern installation of floodlighting has enhanced the beauty even of Venus of Milo and the Winged Victory of Samothrace.

Civic Reception.

After a full session on Tuesday morning, the afternoon was free until the Congress was entertained by the Municipal Council of Paris at the Hôtel de Ville—a magnificent if somewhat ornate building, erected at the cost of a million pounds after the destruction of its predecessor in 1871.

A concert was given by the band of the Garde Républicaine, and an address of welcome was read by M. Raymond Laurent, President of the Council. "Such Congresses as this," he concluded, "give pleasure to all who believe that scientific work and discovery should be made common property for the benefit of mankind in general. Paris, ever mindful of the need of ameliorating working class conditions, applauds your initiative, follows your proceedings with interest, and offers the sincerest good wishes for the continued progress of your industry."

Mrs. Harold Smith and her Party in the Place du Tertre, Montmartre.

British Papers.

Mr. Widlake and Mr. LeFevre presented their Papers, in abstract form, on Wednesday morning; and it was obvious, not only from the exceptionally good attendance but from the real effort made to construct a discussion, that they had created a great deal of interest.

Other Reports and Papers were presented in the afternoon, and the business was closed with the minimum of ceremony.

La Comtesse de Comminges.

The Opera.

This last evening witnessed a programme of Ballet at the Opera House—a special show, we believe, for "congressistes," since gas men were sharing Paris with petroleum technologists, wool traders, and others. For this, the men were reunited with their ladies, who had previously been visiting shopping centres of renown and costliness, the real Montmartre, and the Bagatelle Rose Gardens in the Bois.

It was a finale both interesting and enjoyable; but the writer, for one, would have preferred light Grand Opera with music more ancient than modern.

By midday Thursday the British delegation had broken up—Mr. and Mrs. Dixon, Mr. and Mrs. Mitchell, Mr. Bernard Browne and family, and Dr. Dent to join the official visit to Touraine; others to make holiday on the Continent. It was a comparatively small contingent that travelled from Dover to Victoria, raised a glass to "Berlin 1940," and realized with regret that it was the last time they would be "organized" by Mr. Alexander as Secretary of the Institution. His bouquet awaited the "Presidentess" at Victoria.

Mme. Marc Ferlet.

Our Hosts.

The Second International Gas Conference in Zurich in 1934 gave rise to certain opinions which were expressed in an Editorial Note in the "JOURNAL" for Sept. 19 that year. The Third has rather strengthened those impressions, and we propose to return again later to the subject. But however we approach the problems connected with the conduct of a conference of 700 people of varied tongue, custom, and inclination, we have nothing but admiration for the way our French friends ran the recent one and gratitude to our indefatigable hosts. M. Mougin's staff to those available at Gas Industry House is as brigade to corps headquarters in numbers; yet all the arrangements passed off without noticeable hitch of any kind. And what a serious situation they had to face when it became apparent that labour trouble would prevent the great Exhibition forming the background of the Congress. Apart from the official arrangements, it is our pleasure to record the British delegation's gratitude for the whole-time assistance and entertainment placed at their disposal—from the bouquet which greeted each lady at her hotel to the parting call at the Continental on Thursday morning. M. Louis, of the Gaz de Paris; M. Lebon, President of the Union Syndicale; M. de Comminges, of Gaz pour la France et l'Etranger; Mesdames de Comminges and Marc Ferlet, our hostesses of the reception committee—we thank you.

Materials and Their Testing

Joint Committee Discussion

The first technical discussion under the auspices of the Joint Committee on Materials and their Testing, of which The Institution of Gas Engineers is a subscribing member, will be held in the Large Hall of the College of Technology, Manchester, on Oct. 29, at 2.45 p.m. The subject for discussion will be Notched Bar Impact Testing, and contributions have been promised by Herr M. Moser (Fr. Krupp A.-G., Essen), Mr. L. W. Schuster (British Engine Boiler and Electrical Insurance Company), and Prof. R. V. Southwell (Oxford University).

Members of the Institution wishing to attend or to receive advance copies of the Papers (for which a small charge will be made) should communicate with the Secretary of The Institution of Gas Engineers.

Technical Service for Gas Consumers

An extract from a Paper read before the International Gas Union, in which the Author surveys the general problems confronting the gas undertaking desirous of giving its consumers the best possible service, and reviews the service policy of his own Company.

by
R. N. LeFEVRE
(of the Gas Light and Coke Company)

It is not possible generally to group by countries the degree of consumer service given, as investigation shows that this may vary considerably among the undertakings of any one country, and very little unified national policy in this respect is apparent.

The fact that consumer service begins at the gas appliance appears to be appreciated generally by the Gas Industry throughout the world. A comprehensive review[1] of the national policies governing the testing of gas appliances has previously been published and renders this aspect of the subject redundant here.

The degree of actual installation and maintenance service undertaken will in turn affect the standard of material, equipment, and personnel required, and the quality of each requires careful determination. While specification and testing will ensure the former two the latter can be obtained only by proper training. Where, when, and how this training is given is an aspect of the subject which, although of the greatest importance of all, is, apart from few exceptions, the one to which least material attention is actually given. Undertakings are universally in agreement that proper training is essential where consumer service is to be given.

In most countries considerable attention is paid to the standardization of quality of materials and tools[2] together with the maintenance of quality by testing and control methods. In countries where national technical associations are in existence the Gas Industry of the country is, in most instances, affiliated to the national organization and relies upon it for specifications for tubing, fittings, and tools since so many of these items are applicable to other engineering industries.

As previously stated, a review of gas consumer service country by country is not possible owing to variations of policy among the undertakings of almost every nation, but the following examples will indicate the degree of consumer service offered and the work in connection with testing and training which is now being done in Great Britain, Germany, and the United States of America.

(*a*) Great Britain.

In Great Britain and throughout the British Commonwealth the active standardizing body is the British Standards Institution. Another important national organization is the Department of Scientific and Industrial Research which maintains, among others, the National Physical Laboratory. There is close co-operation between the two bodies.

The British Gas Industry maintains ten active national co-ordinating authorities each concerned with particular aspects of the Gas Industry's welfare and nearly all concerned in various respects with the problems relating to service to the consumer. In addition these national Gas organizations maintain a close contact with the national bodies mentioned above.

For the British gas undertakings generally it may be said that complete consumer (or, as we prefer to call it, customer) service is given. Gas undertakings supply and install all types of appliance and have organized schemes of maintenance service. Appliances, fittings, and tools are of approved quality and are purchased from manufacturers of repute who make to standards specified and controlled by the larger undertakings.

The larger undertakings have training schemes for apprentices and gas fitters. A comprehensive Education Scheme is fostered by The Institution of Gas Engineers in conjunction with the Board of Education. This scheme provides among others for professional training in Gas Supply and for the vocational training of the operative. In 1936, the total number of candidates who sat for the professional examinations in Gas Supply was 257, while 1,934 candidates took the practical and theoretical examinations in Gas Fitting. With a few exceptions, such as the Gas Light and Coke Company, the training for these examinations is obtained at evening classes held at local technical schools maintained by the State and municipal authorities.

Facilities are offered to employees of the gas undertakings to attend these courses, and, in many instances, fares and fees are refunded to students.

At least two manufacturers of gas appliances—the Ascot Gas Water Heater Company, and Electrolux, Ltd.—maintain specialist schools and give free tuition to employees of gas undertakings.

(*b*) Germany.

Active national organizations for the standardization of materials are controlled by the Deutscher Normenausschuss (D.N.A.) (German Standards Committee). In addition to general standards covering the industrial field as a whole (Dinormen) there are standards applicable to particular industries (Fachnormen). Included in the latter is a Gas Industry division (Gasgeräte Ausschuss) which formulates standards for appliances and fittings and also standardizes methods of testing appliances and equipment of all types.

The consumer service of German gas undertakings appears generally to cease at the distributing main, the whole of the actual consumer contact—sales, installation, service, and complaints—being in the hands of dealers and contractors. In Berlin, certain of the larger installations of industrial appliances are carried out and serviced by the gas undertakings which also issue memoranda, give lectures, and do active work in educating the dealers' and contractors' staffs.

Manufacturers of gas appliances in Germany have for some considerable time been active in appliance design and employee training. The firm of Junkers G.m.b.H., of Dessau, for example, has a well-equipped up-to-date training establishment. This is comprised of two distinct sections: the Apprentices' Training School, where lads straight from school are taken into residence and serve a four years' apprenticeship, and the Gas Appliance Mechanics' School, where short courses of instruction are held for mechanics from gas undertakings and their contractors. It appears that the majority of those attending the latter school are employees of heating engineering and similar firms (Installationfirmen) who are responsible for gas appliance installation and subsequent maintenance.

(*c*) United States of America.

In no other country of the world, perhaps, are the general ideas of customer service in the widest sense so fully appreciated as a national whole as they are in the United States of America. The American Gas Association is maintained by gas undertakings and appliance manufacturers in unison and is responsible for the testing of all, and the design of some, gas appliances and equipment, although certain of the larger undertakings maintain laboratories and carry out routine testing control of appliances and fittings. The A.G.A. has a series of corresponding training courses which are designed to be organized by local gas undertakings for group study.

The following extracts from a recent review[1] reveal the importance that America is attaching to the need for customer service and some of the problems she is encountering.

"The success . . . has largely been due to the revolution in the design and manufacture of gas burning appliances. To-day we think only in terms of enamel and almost entirely of automatic appliances. A range must be . . . capable of almost human intelligence in cooking capabilities. Water heaters must be able to turn themselves on and off when the householder runs any faucet in his house. Central house heating units are built to respond to the least variation in room temperature while not receiving any attention from Fall to Spring. These are but a few of the advantages on which the users of modern gas appliances have learned to rely without question. Few people outside

[1] Stephen Lacey and C. A. Masterman, "National Policies Governing the Testing of Gas Appliances." Institution of Gas Engineers. Publication No. 109/14, 1935.

[2] S. F. Dunkley, "Standardization and Quality Control." Transactions of British Junior Gas Associations, 1934-1935, Vol. XXV.

[1] M. Milne Watson, "An Outline of Customer Service Rendered by Gas Companies in the United States of America." Public Utility Fortnightly of America.

the industry, however, appreciate what a strain all this has thrown on the service side of the business.

"The old time service man was little more than a pipe fitter. To-day he is required to be a highly trained engineer, and the change over in the organization to provide for this has been not only difficult in the short time available but has been a considerable financial burden. To add to the difficulty the revolution in gas appliance design, and this is not too strong a phrase to apply to it, has been extremely rapid and continuous. Every few months some appliance manufacturer introduces further novelty in design or some additional labour saving device. Immediately these are sold to the public either through dealers or the gas companies' own New Business Departments, and the Service Departments are expected to do all the necessary maintenance and repairs with quite insufficient time to educate their service men. Moreover, many appliances only show their peculiarities when out on the field, with the result that there is bound to be a certain amount of experimental work done on them on the customer's premises, and this inevitably makes for bad customer relations.

"It is essential to bear this in mind while appraising customer service. It is only too easy to criticize service as bad while forgetting that selling policy is largely responsible for the situation, and that, try as one may, one cannot turn a fitter into an engineer in 24 hours. For the next few years every gas company will be building up a better trained and more technical force of service men and as this is done so should customer service be improved. It is bound to be an expensive course to take, but no one will dispute its necessity. There is probably no other country in the world more rich in selling ability than is the United States, and the Gas Industry has its full share of this. But the sale of gas appliances is not like the sale of a motor car or a fountain pen. It is a means rather than an end. Unless the purchaser is satisfied with the apparatus he will either reject it or at any rate avoid using it to its maximum, and this, of course, entirely defeats the objects of the gas company.

"Merchandising in itself should not be and rarely is of profit to the utility company. Moreover, certain gas companies in the States go even further and abandon merchandising altogether to their dealers. This raises an interesting but entirely alien problem, but the point remains that although no gas company can afford to avoid the stimulation of merchandising directly or indirectly, its greatest responsibility begins after the installation of that merchandise in a customer's house. It must see that the appliance is kept installed and kept in efficient working order, for here is the keystone of the whole business. It is a matter of regret that only too often this is not fully appreciated and the Service Department is looked upon as of secondary importance to the New Business Department. It is not possible to overrate the importance of the Customer Service Department in load building as well as load keeping, and companies must be prepared to expend money on the service side of their business.

"The theory of customer service might be divided into two parts: First, the most important side, its application to the customer; second, the methods and organization employed by the gas companies in giving this service.

"To have customer service from a customer's point of view one must at once accept the fact that from this angle perfection is impossible. The more service is given, the more is demanded, but even more disappointing to a gas company than this is that consumers are never surprised and rarely pleased with what service they do get. This fact should be clearly understood by gas companies; but while never being allowed to act as an excuse for any delinquencies, it should not be allowed to upset the true sense of proportion of what is necessary as against redundant service. Fear of criticism has, I think, driven some gas companies to slightly absurd lengths in rendering service.

"It is when we come to study the methods necessary to provide repeated and efficient service that we find how far the gas companies in the United States have gone. Almost all the companies I visited have or are in the process of adopting the centralized system by which all orders for service are received at one office and the work is then passed out either directly from a single central shop or through two or three according to whether this is made necessary by geographical size. The advantages of this method have made it almost universal. It provides possibility for the complete and central keeping of records, it avoids the differential treatment of consumers between district and district, it gives complete fluidity of labour to be able to cope with sudden calls in any one area and it makes for saving in costs by reducing overheads, transport and office work generally."

The real backbone of customer service is the training of the personnel. Here again we have two schools of thought, the companies who believe that every service man should be able to deal with every job as against the theory that specialists should be employed for such things as refrigerator and house-heating work. Probably the answer is that it depends upon the size of the company and that large companies do best with specialists and the small with the all-round workmen. Whichever system is employed, it is essential that a foreman or specialist attend to every call made for the third time within a three-month interval.

As the labour side of the service is the most expensive, so it is logical that it should be the most studied. In this branch money cannot be over-spent, because the more expert the men, the fewer will be the requests for service and greater will be the reduction of chronic complaints. Throughout the country I have found very fair realization of this, but in many cases, if criticism is to be made, I feel that not enough money is spent on "refresher" courses for the men, which, in view of the ever-changing type of appliances, is becoming more than a necessity.

Amalgamation and Grouping

South-Eastern Offer to North Middlesex.

The following are the terms of the offer which was recently made by the South-Eastern Gas Corporation to stockholders of the North Middlesex Gas Company:

(*a*) For each £100 nominal value of 6% standard consolidated ordinary stock of the North Middlesex Gas Company:

133⅓ ordinary shares of £1 each of South-Eastern Gas Corporation, Ltd., credited as fully paid, together with £2 16s. 3d. in cash, being a payment in lieu of the net dividend accrued (but not payable until September) for the half-year ending June 30, 1937, on the ordinary stock of the North Middlesex Gas Company.

(*b*) For each £100 nominal value of 5% preference stock of the North Middlesex Gas Company:

125 4% irredeemable cumulative preference shares of £1 each of the South-Eastern Gas Corporation, Ltd., credited as fully paid, together with £1 17s. 6d. in cash, being a payment in lieu of the net dividend accrued (but not payable until September) for the half-year ending June 30, 1937, on the 5% preference stock of the North Middlesex Gas Company.

(*c*) For each £100 nominal value 6% preference stock of the North Middlesex Gas Company:

150 4% irredeemable cumulative preference shares of £1 each of South-Eastern Gas Corporation Ltd., credited as fully paid, together with £2 5s. in cash, being a payment in lieu of the net dividend accrued (but not payable until September) for the half-year ending June 30, 1937, on the 6% preference stock of the North Middlesex Gas Company.

The South-Eastern Gas Corporation ordinary and preference shares will rank for dividend from July 1, 1937. The dividends on the ordinary shares of this Corporation paid in respect of the last three years were at the rate of 6% per annum, and at this rate the shares offered will produce a return of £8 per annum as compared with the dividend of £7 10s. per annum payable on each £100 ordinary stock of the North Middlesex Gas Company. The exchange of preference shares of the South-Eastern Gas Corporation for preference stock of the North Middlesex Gas Company will produce the same income and will also give a capital appreciation of approximately 12½% in market value.

Cash at the rate of 20s. for each 4% irredeemable cumulative preference share and at the rate of 25s. for each ordinary share will be paid in respect of any such shares which, on allotment at the rates aforesaid, will fall to be allotted in fractions.

If this offer is accepted by holders of less than 55% of the ordinary stock of the Company, the Corporation reserves the right to withdraw the offer.

This offer is conditional upon the acceptance thereof not later than July 5, 1937, and will be completed on July 30, 1937, on which date (in exchange for the certificates of title to their stocks and duly executed transfers thereof) the Board will allot to such holders the number of shares respectively in the capital of the Corporation, credited as fully paid up, to which they may be entitled in accordance with the terms of this offer.

Employees will be retained in the service of the Company under the existing conditions as far as is practicable. It is the intention of the South-Eastern Gas Corporation to continue the Co-partnership Scheme, the Contributory Pensions Scheme, and the Sick and Benefit Scheme in force for the benefit of the North Middlesex employees.

THE ANNUAL MEETING OF

The Waverley Association of Gas Managers

One of Edinburgh's most Famous Landmarks.

The Annual Meeting of the Waverley Association of Gas Managers was held in the Y.M.C.A. Hall, South St. Andrew Street, Edinburgh, on Friday, June 18—Mr. W. B. McLUSKY (Engineer and Manager of the Halifax Corporation Gas Department) in the chair.

It was typical of the spirit of the Waverley Association and further evidence of the esteem in which they hold Mr. W. B. McLusky that after an interval of no less than thirty-seven years they should have invited him once again to accept their Presidential chair. And Mr. McLusky showed himself equally willing to return temporarily from the "foreign" land where he is at present making a name for himself to take a leading part in the activities of the Association which has always been nearest his heart.

A popular President, therefore, coupled with that atmosphere of good comradeship which is always a feature of the Waverley meeting spelt success to the gathering before a foot was set in the conference chamber.

The HON. SECRETARY (Mr. R. J. Philp, of North Berwick) having announced the apologies for absence, the PRESIDENT referred with pleasure to the presence of a distinguished visitor—namely, Mr. J. Bridge, of Elland—to whom he extended a cordial welcome to their meeting.

The HON. SECRETARY thereafter read the minutes of the last Annual Meeting, which were duly confirmed and signed.

The PRESIDENT referred with regret to the losses the Association had sustained since their last meeting through the death of certain of their members, and all those present stood for a moment in silence out of respect to their memory.

The following applicants were then elected to Membership of the Association:

R. T. Duncan (Lasswade and Bonnyrigg),
D. R. Wardell (Coldstream),
P. B. Pretsel (Stewarton),
H. Tanner. (Kirkconnell),
A. R. Anderson (Alexandria), and
Messrs. Hardacre and Frith (Berwick-on-Tweed);

and to Extraordinary Membership.

J. W. H. T. Irvine (Musselburgh).

The New President.

The PRESIDENT said it was now his pleasure to propose that Mr. D. Melvin, of Edinburgh, be appointed to follow him in that chair. They all knew Mr. Melvin; he was quite a young man, but he held a very responsible position in the Industry. Mr. McLusky said he had great pleasure in proposing that Mr. Melvin be elected President of the oldest Association of Gas Managers in the world.

The resolution was carried unanimously, and, in acknowledgment, Mr. MELVIN said he considered it a great honour to be elected President of the Waverley Association, and it was with a certain feeling of misgivings that he accepted the position because he had to follow a long line of very distinguished Presidents. He would, however, endeavour to uphold the position to the best of his ability. The Presidency of the Waverley Association was no sinecure; in the first place he had to prepare a Presidential Address—and this, unlike those presented to other similar Associations, was open to discussion. He would try to produce an Address next year which would give them ample scope in this respect.

The PRESIDENT said that it was unnecessary to go through the accounts, and he would content himself by saying that the Association was in a very healthy condition financially.

Mr. MELVIN endorsed what the President had said in regard to the Association's fine financial position, adding that in his opinion credit for this was due to their Hon. Secretary, Mr. Philp, and to their Hon. Auditor, Mr. J. O'Halloran. Their position was very strong compared with the old days, and the Committee felt that they should do something useful. They had come to the conclusion that they could not do better than try to assist the members of the Scottish Junior Gas Association, and they therefore proposed to award two prizes to each district for the best Paper read by a member during the session. These would be known as the Waverley Prizes, and would consist of useful technical books valued at three guineas and two guineas respectively. He suggested that the details of the scheme be left to the Committee to put before them next session. The suggestion was heartily accepted.

Mr. R. W. COWIE (Hawick) proposed, and Mr. R. J. GAVIN (Melrose) seconded, that the usual honorarium be given to their worthy Hon. Secretary in recognition of his efforts for the Association. This was carried unanimously, and Mr. PHILP expressed his appreciation.

Mr. GAVIN went on to propose that Mr. Philp be re-elected Hon. Secretary and Treasurer for the ensuing year. It was, he observed, almost unnecessary to make such a proposal having regard to the excellent work and wonderful organizing ability which Mr. Philp put forward on their behalf. The proposition was supported by Mr. E. SHIELL (Thurso), and unanimously accepted.

The following two members were thereafter appointed to the Committee of the Association for the ensuing two-year period—namely, Mr. C. Hamilton (Loanhead) and Mr. J. G. Cuthbert (Kelso).

Finally, the PRESIDENT said that if there was one member who should share in the credit for their healthy state financially, that was Mr. J. O'Halloran, their Auditor. In moving Mr. O'Halloran's re-election to that position for the ensuing year, he cordially thanked him for his efforts on their behalf, which was duly acknowledged by Mr. O'Halloran.

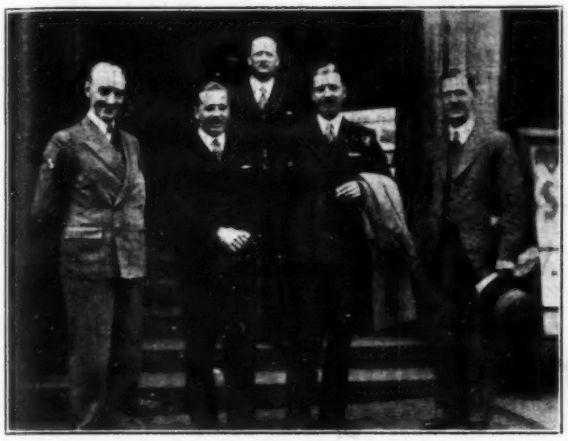
Mr. McLusky then proceeded to deliver his Presidential Address, which, together with the discussion which followed, will be found on other pages of this week's "JOURNAL."

Presentation of President's Medal.

Mr. GAVIN subsequently presented the President's Medal to Mr. McLusky, remarking that the predominating colour

of blue in the ribbon to celebrate the Coronation Year was particularly appropriate because it also marked the completion of twenty-five years' service by Mr. McLusky to the Halifax Gas Department. They wished him health and contentment and a long life to wear the medal.

In reply, the PRESIDENT said that he was still very proud of the old Medal—which he had received at the termination of his previous Presidential year in 1900—but he would be equally proud of the new one by reason of his strong attachment for the Waverley Association; he thanked them all most sincerely.



Four "McLuskys" who were present at the meeting with the Hon. Secretary, Mr. R. J. Philp, behind.

Finally, Mr. D. VASS (Perth) proposed a hearty vote of thanks to the President, in the course of which he observed that Mr. McLusky was the third member to have had double charge of the Presidential chair; it was now, he added, the turn of some of the younger men to come forward. Mr. Vass included in his proposition the members of the Committee, and, in acknowledgment, the PRESIDENT paid tribute to the latter for all the work they had done during his year of office.

Luncheon at the N.B. Station Hotel.

Following the meeting the members adjourned to the North British Station Hotel for luncheon, over which Mr. McLUSKY presided.

The Loyal Toast having been duly honoured at the call of the President, Mr. R. J. GAVIN submitted "Kindred Associations." In doing so he observed that this was a particularly pleasing toast because the longer one lived the more was it apparent what a great value and inspiration the Gas Industry derived from its Associations. The Junior Associations provided valuable "forcing houses" for the young men, encouraging them to find their feet and do their best. Then they had The Institution of Gas Engineers, that fully Chartered body which had done so much for the benefit of the Gas Engineer and the community as a whole. Then they had their own Waverley Association —"mother and father" of all the Associations; their sister Association, the North British, who did such valuable work in connection with education. The Presidency of the North British Association had been held in the past by many eminent Gas Engineers, but he did not think any was more eminent than the present President, Mr. James Jamieson, who had done so much for the Gas Industry in Edinburgh and in Scotland as a whole. With this name he coupled the toast.

In response, Mr. JAMIESON remarked that he had been an extraordinary member, a member, and a past-President of the Waverley Association—a record which he did not think even their President could surpass. Moreover, he had the distinction of being the first assistant to be permitted to join their Association and the first assistant to occupy their chair—which was something of which he was very proud. On that account it was with reluctance that he agreed to forfeit his right to drink this toast with his fellow members of the Waverley Association. That Association was founded in 1861, and was the undisputed "father and mother" of the "family" for which he spoke on that occasion. They were all proud of the Waverley's achievement; they envied its heritage; and they placed it second to none among the Associations connected with the Gas Industry. The Waverley Association demanded the return of its exiled sons to occupy its chair, and members of many other Associations have felt their lives incomplete without its badge of office.

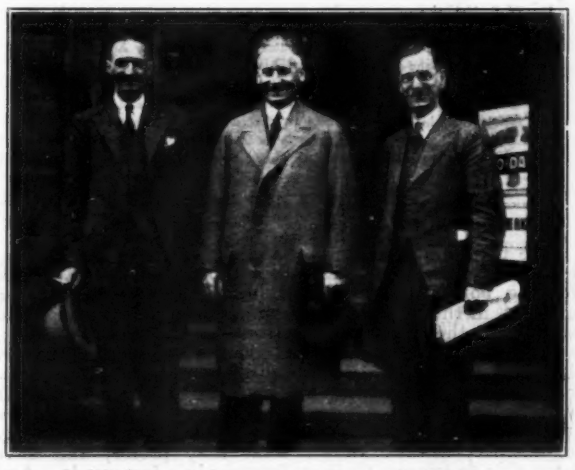
A Plea for Affiliation.

He was particularly pleased, went on Mr. Jamieson, that they had as their President that day his old friend Mr. W. B. McLusky; this was his second year of office—a well-merited distinction, as he was undoubtedly one of the most able and successful Scotsmen they had yet sent across the border. He would like on behalf of the many Associations he represented on that occasion to congratulate Mr. McLusky upon that distinction and also upon the completion of twenty-five years' service with the Halifax Corporation. In these days Associations seemed to multiply at a prolific rate, and it was difficult to keep in touch with the developments which were taking place from day to day; a system of wider delegation of duties would become necessary in the immediate future. It was here that the Waverley Association could be of assistance. So far they had not accepted affiliation with The Institution of Gas Engineers. That was unfortunate, because it limited the direct representation of Scotland on the Council of the Institution. He knew that their stalwart of isolation would not agree with him; but it was too late for the Waverley Association to annex the Institution, and affiliation was the only reasonable solution. This year, said Mr. Jamieson, Mr. Vass was to retire after fifty years' service as a Gas Engineer—a record which he felt would take some beating. During that period Mr. Vass had taken an intimate and practical interest in the affairs of the Waverley Association. Mr. Jamieson suggested that there was no more fitting way of commemorating that work than the linking of their Association with The Institution of Gas Engineers and thereby make the chain complete.

He was very delighted that they had honoured Edinburgh by appointing his Assistant, Mr. Melvin, as their President for the coming year. He was sure he would maintain the dignity of that office and do his utmost to carry out all the duties connected with the appointment. On behalf of the kindred associations for whom he spoke, said Mr. Jamieson in conclusion, he thanked Mr. Gavin for the terms in which he had proposed the toast and for the kind references he had made to himself and his work and to the members for the way in which they had accepted them.

Presentation to Mr. O'Halloran.

The PRESIDENT said that they were on that occasion celebrating another jubilee. Mr. O'Halloran had been with them for almost half a century, and he combined two offices



The President, the President-Elect, and the Immediate Past-President *From Right to Left.*—Mr. W. B. McLusky, Mr. D. D. Melvin, and Mr. R. J. Gavin.

which in business would never be combined; he was not only Treasurer, but Auditor as well, and on their behalf and as a mark of their appreciation of all he had done for them he had great pleasure in presenting Mr. O'Halloran with a pipe and a tin of tobacco.

Mr. O'HALLORAN, in a characteristically breezy speech, expressed his grateful thanks for this token of their appreciation of "what he had never done for the Association."

The final toast was that of "The Chairman," which was proposed by Mr. R. W. COWIE. He had known their President, he observed, for thirty years, and he had known of

him for longer than that because he was a friend of his parents, and he had often heard his name mentioned when he himself was a little boy. Mr. McLusky was one of themselves; he had shown that on that occasion; he had won for himself a position of responsibility in England, where he was as much loved and respected as he was in his homeland. Mr. Cowie traced the President's connections with the Gas Industry from the time of his first appointment forty-six years ago, and although he had now been at Halifax for a quarter of a century he was as much a Scotsman as ever.

Mr. McLUSKY, in acknowledging the toast, which was most cordially accepted, thanked Mr. Cowie for his remarks, and added that if he had to live his life over again he would go back and begin again just where he had started.

Bowling and Golf.

On the day preceding the meeting, the usual sporting fixtures were arranged, and a most enjoyable day was spent at Duddingston by many of the members taking part in both golf and bowls competitions.

The following comprised the winning bowls team:

J. Storrier (Forres)	A. A. Livingstone (Levan)
W. H. Handley (Elland)	W. Cooper, skip (Levan)

The results of the golf competition were as follows:

SECTION I. (Handicaps up to and including 10).

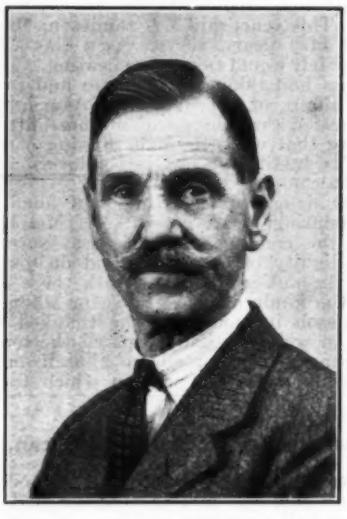
	1st	Handicap	John Pollock, Glasgow
Tie	2nd	,,	Stanley Bennet, Edinburgh
Tie	3rd	,,	Fred. Keillor, Comrie
Tie	4th	,,	Sam. Hall, Edinburgh

SECTION II. (9 Handicaps 11 and over).

1st	Handicap		C. Hamilton, Loanhead
2nd	,,		W. McRobbie, Edinburgh
3rd	,,		J. Galloway, Edinburgh
4th	,,		J. D. Coupar, Glasgow

The best scratch score was 71 by John Pollock.

At the conclusion of the competitions all the members taking part gathered for high tea in the Duddingston Golf Clubhouse, when the prizes, which were kindly donated by members of the Association and friends, were presented to the successful competitors.



THE PRESIDENT.

Mr. W. B. McLusky spent the first seven years of his business career in the workshops of the well-known Clydeside engineers and shipbuilders, Messrs. Blackwood & Gordon. His early studies were directed by Andrew Spouil, James McCubbin, and James Duff, in various branches of mechanical and gas engineering and chemistry. After holding appointments as Engineer and Manager of various Scottish Gas Undertakings from 1891 onwards, Mr. McLusky was appointed to his present position in charge of the Halifax undertaking in 1912. He has held official positions in various of the District Associations, including the Presidency of the Manchester, North British, and Waverley.

THE WAVERLEY ASSOCIATION

Presidential Address

OF

W. B. McLUSKY

(Engineer and Manager of the Halifax Corporation Gas Department)

Presented at the Annual Meeting of the Association held on June 18 at the Y.M.C.A. Hall, South St. Andrew Street, Edinburgh. A report of the business session will be found elsewhere in this week's "JOURNAL."

The traditional Address of the President to the Waverley Association of Gas Managers should bristle with challenging points and points of practical interest to those engaged in the work of gas manufacture, distribution, and supply in the Waverley District—an Address, in short, such as that presented by our talented President last year. It is my purpose to stimulate discussion, to hear the members express themselves; and for that reason my remarks will be brief.

The members of the Waverley Association have, in my experience, always known what they prefer, and have been able to express their preferences in a few words. And when I lived in the Waverley District, I realized the truth of Robert Louis Stevenson's remark that there is a certain type of person who will not humbly say "Amen" to what the world tells him. That type of person is exemplified in J. B. Priestley's character, Jess Oakroyd, who asked: "Have you *been* there?"

The Waverley District has provided scope and opportunity for the pioneers, among whom I remember Dr. James Young and later William Young (no relation), who in his early manhood was a gas engineer in a small town seven or eight miles from this city. Dr. Young founded the oil industry of the West Lothian and of the world. He started, of course, with horizontal retorts—when he returned from Derbyshire. William Young invented the vertical retorts. William Young and George Beilby (later Sir George) perfected the vertical retort for the carbonization of the West Lothian shales.

Contact with these developments no doubt stimulated interest in process work. The Gas Industry in this district was in the early years strengthened by recruits from the oil industry.

William Young was identified with both industries for the greater part of his working life. He introduced a university graduate—a school teacher—to the Gas Industry; one who proved to be a critical investigator and, eventually, a successful manager. But it was one of his unsuccessful experiments that suggested to William Young a process now in common use—the treatment of town gas by washing in oil. It was an unusually severe winter. He had difficulty in preventing the formation of ice in the interior of consumers' wet gas meters. He sent inspectors round to trim the wet meters with refined paraffin oil, and he got rid of the ice trouble, but the illuminating power of the "stripped" gas was, as you can well imagine, unsatisfactory.

The consumers of gas in the Waverley District have always been well served. The number of houses per acre has always been low and the mileage of mains great in relation to the amount of gas sold, yet the price of gas has always been remarkably low. Forty years ago, for example, the price of gas in Galashiels, Hawick, and Selkirk was 3s. 4d., 3s. 6½d., and 3s. 6½d. respectively for gas in the region of 30 candle-power per 5 cu.ft. supplied.

	Cu.Ft.
The average consumption of gas per consumer in Galashiels was	13,500
And the average consumption per inhabitant was	2,947
The average consumption of gas per consumer in Hawick was	14,500
And the average consumption per inhabitant was	2,359
The average consumption of gas per consumer in Selkirk was	10,900
And the average consumption per inhabitant was	3,166

To maintain a supply of gas of so high a quality at so low a price was an achievement, especially taking into

account the low average consumption of gas per consumer and per inhabitant. But the rich coals, although high in price, "responded to treatment" in the retort house. The average yield of gas per mouthpiece, with stop-end retorts 9 ft. long by 22 in. by 15 in. in section, was over 12,000 cu.ft. per diem in Berwick-on-Tweed in the year 1896, and in Galashiels at an earlier date figures correspondingly good were obtained.

The Early Days of the Heavy Charge.

Mr. Joseph Smith, of Hawick, was one of the pioneers of the heavy charge, and his son, Mr. J. D. Smith, then at Selkirk, conceived and operated a system of carbonizing a proportion of a rich brown cannel, which, though heavy in ash, was rich in gas, and had other qualities not inherent in some of the cannels which combine in themselves a superior coke and a good gas.

This mixture of coals was carbonized only in those retorts the residual coke from which could be discharged automatically into the producers which fired the retorts. A great advantage of this scheme was that clinker was not formed in the producers.

In those early days a question much discussed was the relative advantages of mixing rich coals and coals which produced a lean gas in the same retort. The late Mr. William Young was an advocate of this system, provided always the coals so mixed could be carbonized uniformly within the same space of time. Mr. George Hislop, of Paisley, found in his experience that coals carbonized in this way enhanced the average candle power of the gas produced by nearly 8%. Mr. F. T. C. Linton, of Leith, and Mr. James Hislop, of Maryhill, carbonized different grades of coal in retorts heated to the temperatures which proved to be the correct temperature for that particular grade of coal.

All gas was manufactured under slight pressure in the retorts, and in most works lime was used, to the exclusion of oxide of iron, in the dry purifiers.

At the time I was in personal contact with Mr. William Young I heard a shrewd observer remark that his insight was such that he might have been literally inside the retort. But I question whether Mr. William Young, with all his knowledge and experience, would have designed a vertical retort to deal with a moving charge of highly bituminous coals. He would certainly have taken means to protect the gases occluded from the coals from contact with the hot walls of the retort in their passage to the ascension or descension pipes; but the static charge and the intermittent discharge would, I think, have satisfied his requirements for the carbonization of coal of this character.

William Young used the descension pipe in his experiments in what was described as the "Young and Aitken Analyzer," erected in Falkirk Gas-Works. The modern equivalent of the Young and Aitken Analyzer is the Congdon tower. The Young and Aitken Analyzer was designed to deal with tar acids and for other purposes.

Rate Structures.

The Rate Structures Committee of the American Gas Association, in their Report—a copy of which I received in November last through the kindness of my friend Mr. Theodore V. Purcell, until recently Vice-President of the People's Gas Light and Coke Company, Chicago, Illinois—is so rich in information and suggestion that I feel compelled to submit, for our help and assistance, a few extracts from this most comprehensive document.

The Rate Structures Committee of the American Gas Association is composed of 26 representative members.

The Report to which I have referred deals with the following, among other things:

1. Developments in the art of rate-making caused by changes in the existing and probable future conditions.
2. Sound methods of costs analysis.
3. The study of fundamentals and a thorough analysis to show the cost of:
   - (*a*) Serving the business, and
   - (*b*) A survey to show the value of the service, including convenience and intangibles.
4. The investigation of load characteristics in various types of business and in residences, and
5. Incremental costs, and rates for additional consumption.

Adherence to the fundamental principles outlined in previous reports is enjoined. But, because of changing conditions, attention is directed to the need for further study of the cost of service and the value of service, because, in the "residential field," competition has been assuming a place of constantly greater importance in recent years, and competition between gas and other fuels has become keener.

It would appear that the "various applications of gas" are confronted with different degrees of competition and that each one requires a different "price level" in order to retain existing business and secure new business.

The majority of the gas companies appear to have adopted separate schedules for:

(*a*) Commercial and
(*b*) Industrial purposes, and
(*c*) Special house-heating based largely on incremental cost and competitive conditions, and
(*d*) Rates for water heating and residential service.

One large undertaking has offered a special discount of 15% on accounts ranging from (the equivalent of) 8s. to £5 per month to customers whose "major space-heating requirements are supplied by gas-heating equipment," if a gas range and a gas water heater are also in use.

Yet the Committee conscientiously discusses the disadvantages of what are termed "class rates." The conditions under which these may be used and the legal justification for them are not to be lost sight of.

In general, the Committee characterize "class rates" as "valuable tools" in meeting competition.

The therm is not regarded as a "panacea for competitive problems."

In Chicago alone there are thirteen service classifications, all scientifically worked out and all stated in simple and easily-assimilated terms.

There is not time here and now to give you even an outline of these schedules of prices, but the following particulars should excite interest in the subject. In Classification No. 1, General Service, the charges are:

For the first 2 therms	90 cents (equivalent to 3s. 9d.)
For the next 8 therms	15·8 cents per therm
,, ,, 50 ,, ...	15·5 ,, ,,
And for all over 60 therms . . .	13·3 ,, ,,

The minimum charge per month is 3s. 9d. whether gas is consumed or not.

This scale, as the description implies, is designed to meet the requirements of the general user—the customer who is not disposed to sign any agreement or pay a quarterly service-rental. The "large volume (interruptible) service"—Scale 10—is an example of the terms offered to consumers who are willing to enter into a contract in writing. The terms of this scale are available to any customer who will agree to use gas for the purposes specified—namely, only as a fuel in a steam boiler and only in boilers having a gas-consuming capacity of not less than 500 therms per hour. There are scales for:

1. "Off-peak" steel processing,
2. "Large volume service demand basis,"
3. "Large Volume Service" for gas to be used only in those heating operations specified under contract, but not to include space heating

—and the hours during which gas can be used under this scale are defined.

There is a special classification for bakery service and another for space heating and water heating, and there is a scale for space heating service alone. There is a special scale for residential service, including space heating and automatic water heating.

In all the scales provision is made for a substantial monthly or annual payment whether gas is used or not.

I am sure you will wish me to express here our great appreciation of the work done for the Gas Industry by the American Gas Association in its many activities. I wish to express particularly my personal thanks to two members of the Rate Structure Committee with whom I have been in communication by mail for many years—namely, Mr. Douglas Burnett, of the Consolidated Gas, Electric Light, and Power Company, Baltimore, Maryland, and Mr. Theodore V. Purcell, until recently the Vice-President of the People's Gas Light and Coke Company, Chicago, Illinois. Mr. Purcell is still actively engaged in an advisory capacity.

What Do We Propose to Do?

We observe that the highest price charged, even for the smallest quantity used per quarter, in many towns in Scotland is remarkably low, and that business is increasing by leaps and bounds in every direction—not only for one purpose, but for a large variety of residential, commercial, and industrial purposes. In such circumstances it would, perhaps, be difficult to find a purpose for which gas is not being used in these areas or to devise a scale of charges that would be more useful or advantageous than the scales at present in operation. But in districts where the price of gas is not so low and where competition is keen—effective competition, the displacement of gas by other forms of energy—it is necessary to find new markets; but, when we search for new business, what is our ex-

perience? Is the prospective new customer prepared to pay the existing schedule prices? If we lose 100 customers whose combined consumption of gas, for example, amounted to 3 million cu.ft. per annum, can we, in a town with a static or declining population, find 100 new customers who will be attracted by a *general* service scale that will compete with the alternatives offered for cooking, heating, water heating, and space heating, or must we produce a multiple tariff by means of which the customer can, by the payment of a small quarterly service-rental, have gas for all four purposes at competitive rates—rates which would, indeed, in most cases, defy competition?

You may say: "Oh, yes, of course! If all our customers would pay a service-rental of anything from 6d. to 10d. per week we could supply all their requirements at prices ranging from 3d. to 4d. per therm, to-day. But will all our customers sign agreements—will they undertake to pay so much per week whether they use gas or not?" If not, what is the remedy? A block tariff is no remedy, because the primary rate is too high to attract business. You will say: "There are customers who pay higher primary rates for electricity than are charged by any gas undertaking in this country. There are, for example, consumers who, for domestic heating, cooking, &c., are paying 1d. per unit (equivalent to 8s. 4d. per 1,000 cu.ft. of gas) for the first 80 units of electricity used per term of four months, and ½d. per unit (equivalent to 4s. 2d. per 1,000 cu.ft. of gas for the same purposes) for all electricity used in excess of 80 units per term, with an annual minimum charge of 15s. whether energy is used or not."

But these are not the competitive rates with which we are concerned. The competitive rates with which we are concerned are 3, 4, and 5 units for 1d. plus a service-rental which, in the most highly competitive sphere of our activities to-day, is 1s. or less per week.

Having agreed to pay this service-rental for electricity, the consumer may find it convenient to cancel his two-part tariff, which provides him with gas at a farthing or less per unit of 4,000 B.Th.U. per cu.ft., and he may reorganize the household on an electricity basis for all purposes—lighting, cooking, heating, water heating, wireless, vacuum cleaner, ironing, &c.—even if the price were as high as ½d. per unit of 3,412 B.Th.U.

We have still in active service five engineers and managers of gas undertakings who were in office in this District when I addressed you last from this Chair, first in 1899 and again in 1900. They are Messrs. J. D. Smith, now of Belfast, David Vass, now of Perth, John O'Holloran, John Richmond, and myself.

It may be interesting, if not indeed stimulating, to recite to you one or two extracts from the particulars I submitted to you in those early days.

EXTRACTS FROM THE PRESIDENTIAL ADDRESS, SUBMITTED IN SEPTEMBER, 1899.

> To-day, if we are to hold our own in competition . . . we are bound not only to supervise the fittings and burners of consumers . . . but to popularize the use of gas and employ every means in our power to have it introduced for purposes other than lighting.
>
> In large undertakings the work is distributed over many officials . . . In small undertakings the whole of the work devolves upon one individual—namely, the manager.

EXTRACTS FROM THE PRESIDENTIAL ADDRESS, SUBMITTED IN APRIL, 1900.

In this Address I fulfilled a promise to open the discussion on distribution topics, with special reference to my experience in the supply and fixing of gas consumers' burners free of charge, and the effect of the coin meter and gas cooker upon the sale of gas. Here is an extract from that Address:

> A group of consumers who, before the cooker was installed, used on the average 50,000 cu.ft. of gas per annum, now use 71,000 cu.ft. per annum with the cooker: increase equals 42%.
>
> A group of consumers who, before the cooker was installed, used on the average 7,000 cu.ft. of gas per annum, now use 15,000 cu.ft. per annum with the cooker: increase equals 111%.
>
> A group of consumers who, before the cooker was installed, used on the average 6,000 cu.ft. of gas per annum, now use 17,000 cu.ft. per annum with the cooker: increase equals 183%.
>
> *Coin Meter Supply.*
>
> A group of consumers who, before the coin meter and cooker were installed, used on the average 4,966 cu.ft. of gas per annum, now use 18,900 cu.ft. per annum with the coin meter and the cooker: increase equals 280%.

Discussion.

Mr. J. RICHMOND (Penicuik) remarked that after the President's kindly reference to himself and other members of the Association he could hardly fail to say something. The Address had recalled to him those early days when they had to make a rich gas, and he recollected that up to 1894 he never used anything but cannel coal; it was only after he left Scotland and went to the south of England that he carbonized ordinary bituminous coal. In regard to rates they had to make deviations in price, but the flat rate was the most honest method if it could be properly applied. The same applied to the purchase of commodities on a large scale; if a man could produce 100 articles at one price he could produce 101 at the same price.

Mr. D. VASS (Perth) complimented the President on the wide scope of his Address, and, in regard to rate structures, suggested that his own method would be to apply the same rate no matter for what purposes the gas was utilized or during what time of the day. Speaking generally, this worked very well in the smaller towns. The industrial rate would only apply when a certain point was reached; he thought that both industrial and domestic rates should be based on the same scale, graduated in such a way as to bring business. The ideal, perhaps, was a service charge with a flat rate after that. But they had been too late in that respect; it was very difficult for them to adopt a service charge because so many people were already paying one for electricity.

Mr. J. BRIDGE (Elland), invited to take part in the discussion, said that they were all very grateful to Mr. McLusky for his Address. He was very interested in his observations in regard to rate structures. He had had a block system in operation for some time, and they prided themselves in Elland that even if they had not been able to get much new business they had been able to maintain existing business. If the block system was to be at all effective it must be well graduated; the initial block must be small and at the lowest possible price. With a properly graduated scale they should have something which would be competitive with the two-part tariff; but it was essential to start at a low figure.

A Unique Association.

Mr. R. W. COWIE (Hawick) said that it was a real joy to see Mr. McLusky there on that occasion. The Waverley Association had always been unique in many respects, not least of which was the way they called upon their old friends to come back and address them and occupy the position they held many years ago. They did a similar thing some years ago when Mr. J. D. Smith, of Belfast, was their President; their Association had no fixed rules, and they altered their ways just to suit the circumstances. Mr. McLusky was an expert on the question of charges. In Hawick they still charged on the flat rate, and they were progressing under that system. A graduated price according to the consumption would raise various anomalies.

Mr. J. W. MCLUSKY (Glasgow) remarked that in the theatrical world it was considered a good thing to have a "comeback;" but their principal actor on this occasion had never been off the stage. It was wise to indulge now and again in reminiscences; but there was not much time for that to-day. The difficulty nowadays was that they had no time to indulge in retrospect. He had had the privilege of talking with friends across the water in regard to gas charges, and the more he studied the matter the more he thought that their method would not do for his own district. A gas undertaking was run at a certain cost, and to operate that undertaking they must collect a certain amount of money. Most of that money came from the gas consumer—and in Glasgow there were 40,000 single apartments with a small meter and a boiling ring. He had made up his mind that complicated tariffs and 4-part schemes were too scientific for the average gas undertaking. To show how democratic a thing gas was, Mr. McLusky recalled that when there had been a cut in the public assistance benefit the gas consumption went down exactly with the cut; and when the cut was restored the consumption went up again, which showed how closely gas ran with the affairs of the household. He closed with a reference to the fact that in a large undertaking the work was distributed among many officials, while in smaller undertakings it often devolved upon one man; he had had experience of both, and he would say that the happiest man was the one who knew all his consumers. Speaking with sympathy for those who had to manage large undertakings, he remarked that the chief official was generally an industrial welfare superintendent. In conclusion, Mr. McLusky said he thought the meeting would agree that it had been a great pleasure to have their President with them on his busman's holiday.

Mr. J. BARKER (Nairn) quoted the system of charge which was operated by his undertaking. They gave their consumers the option of two methods of charge, ordinary and prepayment consumers being treated alike. The first method was a stepped system graded as follows:

		s.	d.	
For the first	2,000 cu.ft. per quarter	6	3	per 1,000
,, next	2,000 ,, ,,	6	1	,,
,, ,,	6,000 ,, ,,	5	10	,,
,, ,,	10,000 ,, ,,	5	7	,,
,, ,,	20,000 ,, ,,	5	0	,,
,, ,,	60,000 (or over) ,,	4	7	,,

Consumptions on separate meters by the same consumer are not combined for the purpose of this scale.

The second system was a two-part tariff based on the number

of rooms in the consumers' premises. The sum of 20s. per annum was charged per room, exclusive of passages and bathrooms, with a minimum charge of four rooms. The subsequent charge for all gas used was 1s. 8d. per 1,000 cu.ft. Gas used for engines or any industrial purposes was charged at the rate of 4s. 7d. per 1,000 cu.ft., with a minimum charge of 9s. 2d. per quarter. All accounts were subject to a discount of 2½% for monthly payment. Mr. Barker said he found these rates acceptable to their consumers, especially the stepped system. The two-part tariff was very slow to sell, but consumers were getting more convinced that it would be to their benefit to adopt such a method. The average amount of gas used by consumers who had adopted the two-part system had increased from an average of 33,000 cu.ft. per annum to 145,000 cu.ft. per annum, and he contended that this was the only way a two-part system offered an advantage to the consumer. At Nairn they had consumers on their two-part tariff who were also paying for their electricity in a similar way, believing it was to their advantage to use gas for cooking and heating although they had electricity for lighting. Mr. Barker emphasized that for a small works such as his, far removed from the coalfields and sources of other supplies, they found these rates of advantage to their consumers and themselves, and they would not go back to the flat rate unless they were compelled to do so by legislation.

Value of Water Heating.

Mr. R. W. Cowie, Jnr. (Hawick), congratulated Mr. McLusky upon an excellent Address, remarking that the work he had done for the Industry was an example to all of them. Many years ago Mr. McLusky was drawing attention to the importance of *selling* gas; nowadays everybody was talking about it, but Mr. McLusky was pushing the matter long before the average individual appreciated its importance. Mr. Cowie referred to the loss they were sustaining in the lighting load, and stressed the importance of gas water heating in regaining that loss. Consumptions of individual consumers would go up by 100% and 200% simply through the regular use of a gas water heater.

Mr. H. Bottomley (Caledonian) said he knew probably more than anyone else in that room how much work the President had put into the matter of gas charges; he had really got behind the question when many people merely skimmed the surface. He had tried many systems, and his hints were worth taking. Mr. Bottomley said he had come up against many problems in Scotland, and there was a great deal to be considered in dealing with consumers who lived in one or two rooms; in such circumstances a fixed charge was very difficult. In his own case the block system had been adopted. Such a system could bring good results if they could get the second block low enough.

Mr. J. McLusky (Calverley, Leeds)—who is the eldest son of the President—observed that his undertaking had introduced a two-part tariff last year. They were a maximum dividend company, and he did not anticipate that many consumers would adopt it. Actually, out of 6,000 consumers, of whom half were prepayment, 397 took up the tariff. And those who had adopted it had increased their consumption by 38%—so that the loss in revenue which they anticipated had not materialized. His Board considered the two-part tariff in comparison with the block rate, and came to the conclusion that the latter was not attractive enough. In the case of the two-part system, however, just as with electricity the consumer paid the standing charge and then forgot about it, only remembering that he obtained all his gas at 4½d. per therm. And it was useful propaganda to be able to emphasize the low cost of running an appliance on the commodity rate. Any Gas Engineer who had to work out a tariff system for submission to his Board or Committee would find that he had a tremendous amount of work to do; but he had been surprised to discover how closely large and small undertakings compared in the average standing charge per consumer. In their own case, for instance, it was about £2 7s. per annum, while that of a large Corporation was £2 3s. He had wanted to increase the consumption per consumer, but had been unable to get water heating going. He had therefore persuaded his Board to allow him to fix fifty water heaters free of charge to the consumer. Actually, of course, they made a loss on every installation, but they might equally well have spent that sum on advertising, for they cleared the first fifty heaters in three months, and now had 400 on the district. At the present time they were pushing refrigeration as hard as they could. From his own experience he was in favour of the two-part tariff; they were up against an electricity supply undertaking which charged 3s. per room per quarter, with current at 1d. per unit for the first 300 units, and ¾d. per unit after that. The Gas Company charged 6d. per week for houses with two living rooms and not more than three bedrooms, 1s. for four bedrooms, and 1s. 6d. for larger houses, with a commodity rate of 4½d. per therm.

Mr. D. Vass (Perth) remarked that he was in correspondence occasionally with New Zealand, and some gas undertakings there had adopted the unique plan of charging half rates for gas wherever water heaters were installed as the only means of hot water supply. That was some indication of the great value of this load. Such an idea would be excellent propaganda.

The President Replies.

The President, replying to points raised by members in the course of the discussion, remarked that if they expected genuine and sincere criticism they expected it from their friends; and they were all his friends. There was, unfortunately, no parallel to gas supply in business; the nearest approach was the telephone, and there one had the flat rate; the telephone people would not install an instrument unless the subscriber promised to pay something. He had to pay 1d. per call—not 1d. per week or per month—and in addition he had to pay an installation charge as his contribution towards the service. In a 'bus or tram one's seat was available for someone else if one did not use it. But if they installed a gas meter in a house there was only one person who could use it, and they had to look after it. A regularly used meter was easier to maintain than one used only intermittently; the gas service pipe was only available to the person for whom it was laid, and he should therefore be expected to make some contribution towards that service.

Mr. McLusky observed that some fifteen to twenty years ago they conceived the idea of installing gas water heaters with no meter, the user to pay 4d. per day, this amount covering apparatus, fixing, gas, &c. They put several of them into barbers' establishments, as well as into restaurants and private houses. Incidentally, the amount of hot water used in a barber's shop was no greater than in a private residence.

It was the intermittent user, went on Mr. McLusky, who made gas dear—not the small house. Mr. Bridge had the ideal scheme, and he did not get it from him; it was a very scientific method, smooth, simple, and easily understood; but the first block was at too high a price. Large consumption per consumer brought the price down. Mr. Cowie had made good use of the flat rate—and if it was low enough it was good enough. The largest gas company in the world had at long last adopted a multiple tariff; Glasgow's scheme was, he believed, the best scheme for Glasgow. (He had lived near Glasgow—near enough!) The democratic scheme made all consumers pay alike; unfortunately it would be too bad to ask all his own consumers to pay alike. They had 14,000 consumers in Halifax, and he would be ashamed to ask some to pay as much as others. The whole essence of their scheme was that it *was* democratic; the small consumer could not afford to pay on a volume basis because he did not want the volume. The multiple tariff was not unfamiliar in Yorkshire; they had had it a long time. There was 4% of the population at the Technical College at Halifax, where the system was explained, and since it started these students had grown up and many of them now had homes of their own in which the multiple tariff was fully understood.

LONDON AND COUNTIES COKE SALESMEN

See the Manufacture of

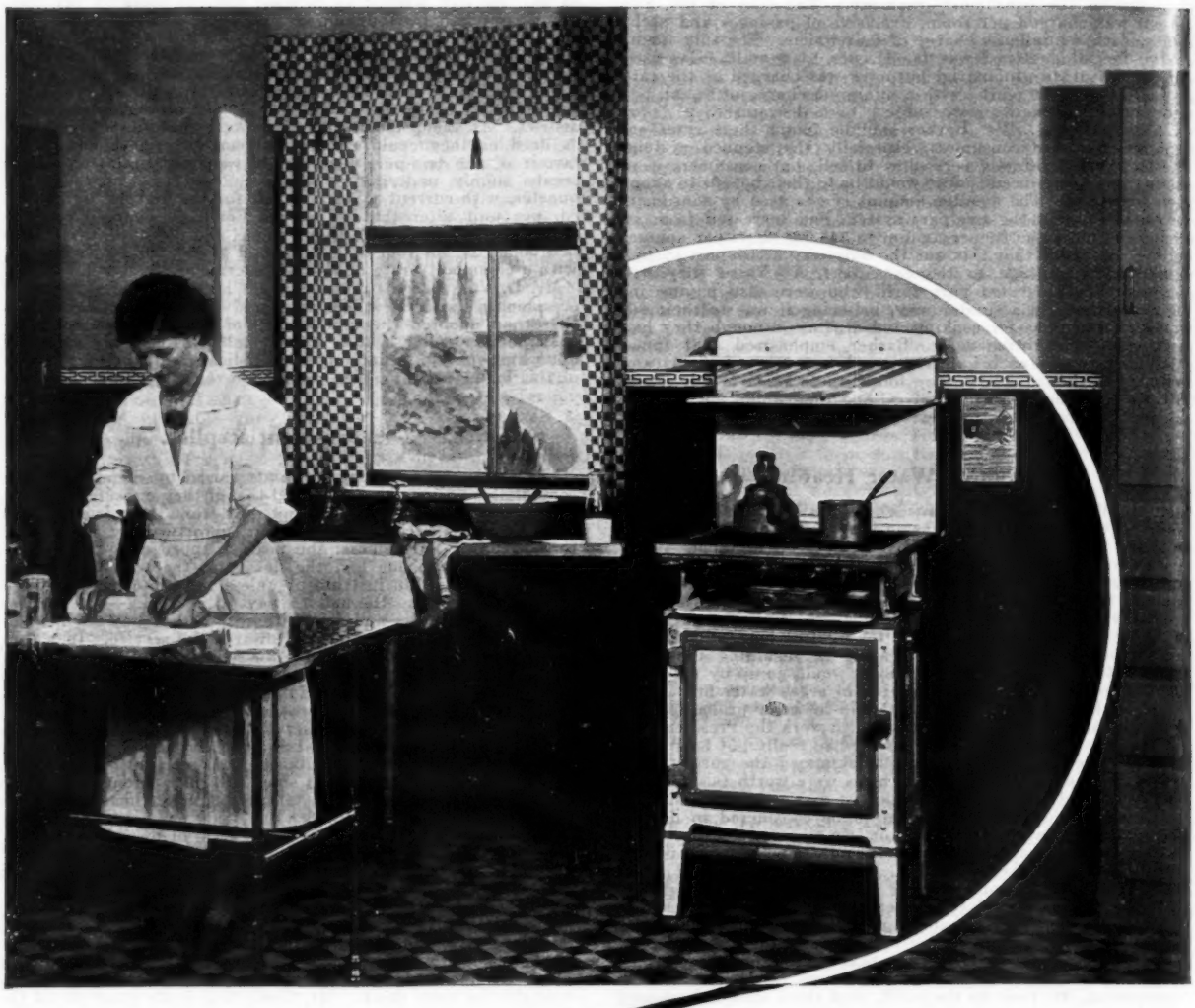
Radiators and Boilers

A party of nearly 50 members of the London and Counties Coke Salesmen's Circle spent a most interesting afternoon on June 9 inspecting the up-to-date works of Messrs. Crane, Ltd., at Ipswich.

The members were welcomed at the works by Mr. C. G. Detlefsen and other senior officials of the firm, and, divided up into small parties, they proceeded upon a thorough tour of inspection. The visitors being chiefly interested in heating equipment, that part of the firm's activities concerned with the production of radiators and boilers, received first attention.

In the drawing office are evolved the plans from which the core moulds are made; the latter are packed with silica sand which is subsequently baked. This sand is of fine quality and of consistent grain and size, being tested regularly in the laboratory; large quantities of specially selected sand are stored in a reinforced concrete building. The sand is dried and screened before being uniformly mixed with a binding medium. The waterways in both boilers and radiators are made by including in the casting moulds these baked silica sand cores, and every individual core is thoroughly gauged and inspected before it is passed to the foundry.

In the foundry old methods have given way to modern scientific thought and engineering skill, and elaborate machines and transporting equipment accomplish, without fatigue, all the heavy and arduous tasks common to all foundries, at the same time eliminating the ever-present risk of mistakes due to the human element. All the machines have been specially designed to suit the par-



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ticular product made, thus enabling a definite system of working to be developed. The keynote of success in a foundry of this description is rigid scientific control, and this feature has not been overlooked; no part of the process of melting and casting is left to chance, each stage having its regular check at predetermined periods.

Mechanization in foundry work has made rapid strides in recent times, and in this department is displayed a remarkable example of modern machinery. Above the moulding machines, the sand conditioning plant receives the used and surplus sand from underground conveyors and after re-treatment distributes to the storage hoppers above the moulding machines. The sand is fed into the flasks or moulding boxes covering the patterns and is rammed to the correct density by a mechanical rammer; at this stage the core which forms the waterway inside the section is placed in position. The moulds when closed are clamped between heavy machined plates to prevent warped or uneven castings. After the moulds are poured they pass on a mechanical conveyor to the shake-out position where the castings are separated from the sand. From here the castings pass slowly, by conveyor, cooling meanwhile, to a vibrating machine which removes the core sand, originally in a hard baked condition, but now very friable and easily removable. The castings subsequently pass to a brushing machine which cleans off every vestige of sand and reveals the smooth even surfaces which combine utility with decorative finish.

Each individual section of all sizes and types of radiators is tested to a hydraulic pressure of 100 lb. per sq.in. While the section is held in the testing machine and subjected to the test pressure, the operator gives it a general inspection, searching for any imperfections which might detract from the high quality and finish desired. Satisfactory sections pass to a machine where a top and bottom right and left hand taper thread is cut, and also a machined face on either side of the connection. The degree of accuracy demanded in machining to maintain alignment of a number of sections ensures pressure-tight joints and ease of assembly. The automatic features of these precision-made machines bears testimony to the inventive genius of the firm's machine tool designer. Alignment gauges and micrometers are in constant use checking the accuracy of the sections as they leave the machines.

The assembly of the radiators is also a mechanical operation, the sections being united by a malleable iron nipple carrying a right and left hand British Standard taper thread. A strong jute paper gasket is inserted between the machined faces of the sections to assist in making a tight joint. Radiators of any desired length are built up section by section by a mechanical assembling unit which screws the sections firmly together by means of the nipple previously referred to. To obviate the risk of breaking the thread by over-winding these assembling (or " screwing ") machines are fitted with a friction clutch device which reverses the travel of the " screwer " when the thread is tight up.

The fully assembled radiator is then given a second test at 100 lb. pressure, which is maintained for several minutes while the inspector is scrutinizing the general finish with the aid of a " pilot " lamp. The radiators are carried at this stage on a mono-rail conveyor, and after thorough inspection they pass to the paint-dipping cubicle where they are first submerged in hot water to remove traces of grease, dust, or dirt which may have collected either on inside or outside surfaces. On withdrawing the radiator from the washing tank it is suspended for a short while on the mono-rail before passing to the paint tank for dipping in a heat-resisting protective coating of light grey paint on all outside surfaces. The manufacture of the radiator is now complete, and it is transported to its particular avenue in the spacious warehouse or direct to the despatch department.

The casting of the firm's boilers demands the employment of highly skilled moulders, as distinct from the more mass-production methods previously described.

Malleable Iron Fittings.

The various processes in the manufacture of the firm's malleable iron fittings were also inspected. The melting and moulding equipment is similar to that previously described, though, of course, on a smaller scale. The castings from the foundry are separated from feeders and runners and loaded into metal barrels where they are rotated for a period of 45 minutes to remove the adhering sand. After inspection they are placed in annealing pots of heavy construction.

The metal in the fitting at this stage of production has a high percentage of carbon and is of a brittle nature; its composition, however, is particularly suited to conversion into a homogeneous malleable iron by annealing. This is carried out in a heavily constructed firebrick oven or housing. Four pots are mounted together on an iron stool, each oven taking 40 tiers of pots—making a total oven capacity of 160 pots, equivalent to 15 tons of fittings. The annealing cycle consists of slowly heating up to a definite temperature and maintaining that temperature for a number of hours until the contents of the oven become uniformly heated. The heating is then stopped and all sight-holes, oven doors, &c., are sealed with clay in order that the cooling may be gradual. The complete annealing cycle occupies seven days, during which period constant control of the temperature of each oven is maintained by automatic recording pyrometers. As the pots containing the annealed fittings are withdrawn from the oven, sample fittings from each pot are subjected to a severe test of their malleability.

Subsequent processes include cleaning and fettling, tapping, screwing, and thorough testing under water, while galvanizing by the hot dip process was also witnessed. An interesting comparison between hand dipping and a more recent mechanical conveyor method was seen in this department. A visit was paid to the section where gunmetal valves and fittings are produced, and also to the laboratories, which contain up-to-date equipment for the examination of metals under the microscope, enabling the metallurgist to ascertain if the heat treatment of the malleable casting has been carried out satisfactorily. Machines to test the strength of the fittings are also in use. In conclusion the visitors passed through the packing and despatch departments, and inspected the spacious stores.

Potential Market for Coke.

A brief reflection upon the potentialities of the output of such a firm from the coke salesman's point of view is not without interest. The year's output of Messrs. Crane, Ltd., is estimated to be, in round figures, about 1¾ million sq.ft. of heating surface. Allowing for export, it is probably not far short of the mark to say that 1½ million sq.ft. of radiator heating surface is going out from this firm alone into the homes, offices, institutions, and factories of the country in the course of one year. Every sq.ft. of heating surface emits 180 B.Th.U.; so that allowing for 70% boiler efficiency the output of this one firm if secured in its entirety for coke would mean an annual increment of some 65,000 tons. And reckoning in all the other manufacturers of similar equipment the potential coke consumption is enormous.

A noteworthy feature of Crane's works is the special attention which is paid to accident prevention. Notices calculated readily to catch the eye are prominently displayed throughout all departments, pointing out the danger of a neglected cut or scratch, while boards in various strategic positions record the number of days since the last accident in each department and the amount of money lost through accidents during the previous year.

Vote of Thanks.

At the conclusion of the tour of inspection of the works the visitors were entertained at tea in the staff recreation room at the kind invitation of the firm, when the Chairman of the Circle (Mr. J. Grayston, of Romford) expressed on behalf of the members their deep gratitude to Messrs. Crane, Ltd., and to Mr. Detlefsen personally, for the facilities provided for giving them such an interesting and valuable visit that day. They had seen something which was not merely of general interest but also of particular interest in so far as Messrs. Crane's business was to some extent dependent upon the efforts of members of the Circle.

The gathering was honoured by the presence of Mr. C. E. Wright (Chief Engineer) and Mr. G. A. Mallett (Manager and Secretary), of the Ipswich Gas Light Company, and the latter offered a few words of welcome to the visitors, remarking that as Chairman of the Suffolk Coke Committee he was particularly interested in the Circle's activities. They had had the opportunity that day, he observed, of inspecting a thoroughly modern works, and without the efforts of such manufacturers of heating plant it would not be much use the members' undertakings making and grading coke. They had seen, added Mr. Mallett, a very live firm making a first-rate article in support of their Industry.

On behalf of Messrs. Crane, Ltd., Mr. C. G. Detlefsen said that from their viewpoint as manufacturers of this type of heating equipment they always felt glad to have gentlemen like the members of the Circle to see what they were doing. They were particularly pleased that representatives of a sales organization should pay them a visit. Such a visit was not only educational, but it also engendered closer and more friendly co-operation between those who had to produce and those who had to sell.

In bringing a most enjoyable afternoon to a close, Mr. Grayston expressed the members' appreciation of the presence on that occasion of Mr. Wright and Mr. Mallett, who had done so much to make the visit possible. Finally, he thanked the guides who had shown them round the works for their services, for which they were very indebted to them.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION

(AUXILIARY SECTION)

THE CHAIRMAN.

Chairman's Address

BY

JOHN W. PALLISTER, A.M.Inst.C.E., M.Inst.Gas E., A.M.I.Struct.E.,

Gas Engineer and Manager, County Borough of Middlesbrough, Corporation Gas Department.

Presented at a Meeting of the Association held at Middlesbrough on Friday, June 18.

Middlesbrough, as you are aware, has been a pioneer in the use of coke oven gas for town purposes, and was, in fact, the first gas undertaking to make use of this source of supply. That the venture has proved a successful one there is no question, and subsequently gas undertakings in many parts of the country where supplies are available have gone over to a coke oven gas supply, including several towns recently in our own North-East area.

I propose in this Address to give you some details of our Works and plant.

The stand-by gas-making plant at the Commercial Street Works comprises a carbonizing plant of 16 beds of inclined retorts of a capacity of 1¾ million cu.ft. per day, and three sets of carburetted water gas plant of a total capacity of 5¾ million cu.ft. per day. Our maximum day's output is just under 5 million cu.ft. per day, and the average daily output of the maximum week is 4½ million cu.ft. The capacity of water gas plant in proportion to the output may appear large, but with a coke oven gas supply this is advisable and, indeed, in my opinion, from past experience, essential to ensure fulfilling the obligations under which the Undertaking is placed to safeguard the supply to the consumers. Since the utilization of coke oven gas at Middlesbrough the stand-by plant has had to be brought into operation on six occasions during periods of partial or complete cessation of supplies due to strikes, accidents at the coke ovens, and to reconstruction of coke oven plant, the longest period being for eight months. In such emergencies the water gas plant can be brought into operation in a few hours and the whole of the output met until the ten days or so required for the starting up of the carbonizing plant. The practice has been to regulate the output of both plants so that practically the whole of the coke available from the carbonizing plant is used up in the water gas plant, thereby performing complete gasification of the coal in two stages and obtaining the maximum quantity of gas from the coal at times when it is difficult to obtain. This is achieved when making about one-third coal gas and two-thirds water gas, giving a total yield of about 35,000 cu.ft. per ton of coal.

The results at Middlesbrough have been a striking example of the success of such a scheme for the utilization of coke oven gas and of the mutual benefit to the gas consumers and the Corporation and to the suppliers of the coke oven gas. The record of interruptions in the supply, however, does demonstrate the necessity for the provision of ample stand-by plant maintained in first-class order, with water gas plant capable of meeting the whole of the output, the cost of which has to be discounted when considering the savings which may be effected by the utilization of a coke oven gas supply.

The No. 1 Retort House contains 16 beds of inclined retorts in two benches, and in the adjoining coal store a stock of 2,500 tons of coal is maintained. Coal from rail wagons is dropped into a receiving hopper and elevated to the retort house by means of bucket elevators in duplicate, which discharge on to push-plate conveyors in duplicate running the full length of the retort house over the coal hoppers above the charging floor. There is no mechanical coke-handling plant, the travelling crane and gantry used formerly for this purpose having been demolished.

No. 2 Retort House accommodated a similar unit to the above, but the retort benches in this plant, which had become obsolete, were completely demolished down to the foundations a few years ago and the house is standing empty until the time when further carbonizing plant is necessary, when an excellent house will be available.

The three carburetted water gas plants comprise one hand-operated Davison plant of 1½ million cu.ft. per day capacity, and two Humphreys & Glasgow plants each of 2,125,000 cu.ft. per day capacity. The latter were reconstructed in 1927 to operate on the back-run process, and again reconstructed in 1934 to automatic mechanical operation and mechanical coke charging. Coke is discharged from rail wagons into an underground feed hopper, from which it is raised by a skip-hoist with a capacity of 15 tons of coke per hour and a hoisting speed of 70 ft. per minute, driven by a 15 b.h.p. electric motor with push-button control. The skip-hoist discharges into a hopper feeding a belt conveyor 44 ft. 9 in. long, driven by a 3 b.h.p. electric motor, which in turn feeds a reversible shuttle belt conveyor 45 ft. long driven by a 3 b.h.p. electric motor. The shuttle conveyor can be moved along its track so as to discharge into any of the overhead steel coke storage hoppers of which there are three, one to each plant, each of 35 tons capacity. The coke is delivered from the hoppers through chutes into the automatic coke chargers on the generators, "Cascade" de-breezing screens being fitted in the chutes. The mechanical operator controlling each plant is driven by a 2 b.h.p. electric motor.

By these two reconstruction schemes the original capacity of the plants was very considerably increased, and the amount of water used in the condensers with the increased rate of gas production was rather high and costly, the whole of the water being obtained from town mains. A 7-in. cast-iron suction pipe was laid to the River Tees, a distance of 365 yd., and connected up to the existing Weir circulating pumps which work quite satisfactorily in spite of the comparatively long suction, and an ample supply of water is thus available with a great saving of cost.

A stock of 300 tons of coke is maintained as a stand-by for the water gas plant, and up to 2,000 tons of gas oil can be stored in the 528,000 gallon steel storage tank. All moving parts of the stand-by section of machinery and plant are run once a week and the whole kept in readiness for instant service. The cost of Repairs and Maintenance of Works has varied from 1·35d. to 6·56d., averaging 2·82d. per 1,000 cu.ft. of gas sold.

Ancillary Plant.

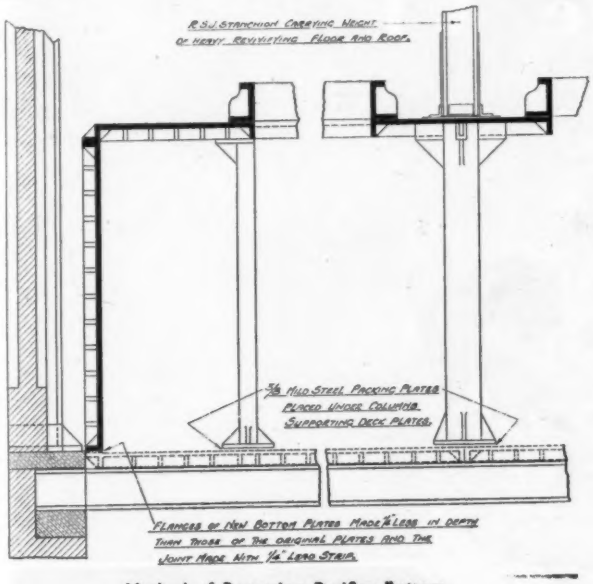
The steam raising plant consists of a battery of four Lancashire boilers, each 7 ft. diameter by 30 ft. long. The boilers burn breeze on Wilton grates, and were fitted last year with Kennicot dejectors for the softening of water and removal of deposits which operation is effected by means of a sodium carbonate outside the boiler in the apparatus itself and obviates the frequent blowing down

of the boilers and consequent loss. The condition of the interior of the boilers since the dejectors have been installed is most marked; there is a considerable reduction in the quantity of scale and what scale there is is much softer and easier to remove.

The exhausters comprise four steam driven units each of 80,000 cu.ft. per hour capacity, two of which are at present being replaced by two new exhausters each of 150,000 cu.ft. per hr. capacity. In the same building are accommodated the air blowers for the water-gas plants comprising two belt driven fans with vertical steam engines, and two steam turbine driven fans, also boiler feed pumps, circulating pumps, oil pumps, and hydraulic lift pumps. Air for revivification *in situ* is admitted on the inlet side of the exhausters through a small steam driven exhauster and measured by meter. The connections in the engine house are arranged to receive gas from three sources simultaneously—*i.e.*, from the coal gas plant, the water-gas plant, and from the coke ovens.

The plant on the outlet of the exhausters is divided into two units, each capable of dealing with 3½ million cu.ft. per day. One section consists of a Livesey washer and two tower scrubbers, and the other section of a Livesey washer and two steam driven Holmes rotary scrubbers.

There are ten purifiers in two units each comprising four boxes 40 ft. sq. by 6 ft. deep. These boxes are all elevated on a steel structure above ground, with overhead revivifying floor. One of these units was erected in 1900 and the other, to the Author's designs, in 1930. Much trouble had been experienced in the older unit through internal corrosion of the bottom plates and in 1923 these were covered internally with a 4 in. thickness of concrete laid in a grill of 2 in. by 2 in. steel angles as a reinforcement.


R.S.J. STANCHION CARRYING WEIGHT OF HEAVY REVIVIFYING FLOOR AND ROOF.
⅝ MILD STEEL PACKING PLATES PLACED UNDER COLUMNS SUPPORTING DECK PLATES.
FLANGES OF NEW BOTTOM PLATES MADE ¼" LESS IN DEPTH THAN THOSE OF THE ORIGINAL PLATES AND THE JOINT MADE WITH ¼" LEAD STRIP.

Method of Renewing Purifier Bottom.

This procedure may have prolonged the life of the bottom plates by strengthening them but did not arrest the corrosion, and in 1935 two of the boxes were laid off during the summer months and the concrete was broken out. The cast-iron plates were found to be badly corroded throughout with many holes right through the plates and it was decided to renew the bottom plates entirely. The concrete was in perfect condition and extremely hard, but nevertheless porous as might be expected with a thickness of 4 in. no matter how carefully mixed. It is impossible to make a 4 in. layer permanently watertight with the result that the corrosive liquor was continually in contact with the plates under the concrete. The removal of the old plates and fitting of the new ones presented considerable difficulty as the bottom plates at the sides and ends of the boxes possessed a return flange which passed under the side and end plates; also the deck plates were carried on columns resting on the bottom plates, and some of these columns supported in addition other columns carrying the heavy revivifying floor and roof above. Great care was therefore necessary in shoring up the deck plates and wedging up the columns to avoid straining the plates and joints in the purifier sides and decks. The flanges of the new bottom plates were made ¼ in. less in depth than those of the old plates in order to allow them to be slid into place beneath the side and end plates. These joints were then made with ¼ in. thick lead strip rather full in width, bolted up and caulked in at the edges, as shown in the accompanying sketch.

The above work was carried out to two of the boxes in the summer of 1935 and to the other two in the summer of 1936, and the cost for the four boxes amounted to £2,220. The result has been entirely successful and no leakages have taken place.

Instead of using concrete as a protecting medium for the new plates a special bitumen compound was utilized which is used for caulking the seams of ships' decks, and with which we have had experience on purifier bottoms for the past seven years. I consider this to be a much more effective protection against corrosion than lining with concrete as the compound adheres firmly to the plates and has remained quite unaffected by any chemical action. Slight wear has taken place in the coating through shovelling and it will require renewing in a year or two. The quantities required for one purifier bottom 40 ft. sq. are 13 cwt., and 1 gallon of binding varnish. The cost of the material for one box was £11 1s. In applying the compound, the surface of the plates should be cleaned and dried and then given with a brush a good coat of the binding varnish, which should be allowed to dry. It is most important that the preparation should be applied very hot and very quickly and in a completely liquid condition. The heated liquid should be conveyed to the job without loss of time in buckets previously heated and poured out quickly, regulating the thickness to about ¼ in. entirely by the action of pouring, without the use of a brush and without making any attempt to screed or level off the surface.

Station Meters.

The gas received from the coke ovens is measured after leaving the purifiers by five station meters, divided like the rest of the plant into two units, there being two wet meters each of 50,000 cu.ft. per hr., one of 100,000 cu.ft. per hr., and two Connersville meters each of 100,000 cu.ft. per hr., one of which has just been installed.

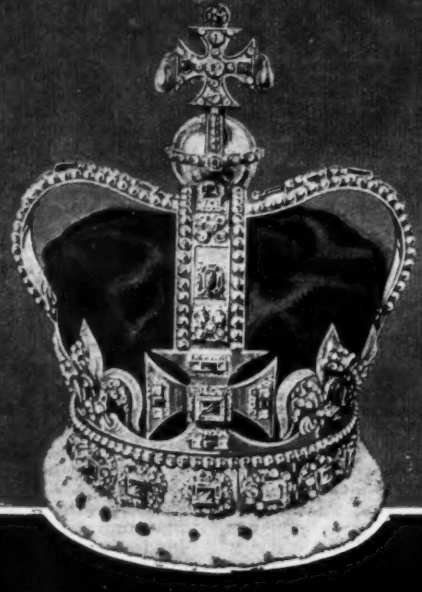
In different parts of the Works—*e.g.*, engine house, station meter house, governor houses—sectional plans of the plant are hung in frames with hinged glass fronts. These plans show all the mains carrying gas, tar, liquor, steam, water, oil, electricity, &c., and all valves are indicated thereon, together with arrows showing the direction of closing and the number of turns. Secured in the plan at the position of each valve is a small brass hook on which is hung an ivorine tally bearing the word "open" in black on one side, and "shut" in red on the reverse side, so that the direction which the gas is taking and the position of all valves can be seen by anyone at any time. The actual pipes in the Works are painted different colours to indicate what they are carrying, with arrow showing the direction of flow, and these colours are repeated on the drawing. I consider a system of this kind very important on any Works having a complicated system of pipes and valves where a mistake may easily be made in an emergency with serious consequences.

Gasholders.

The only gasholder situated at the Commercial Street Works is a 2-lift column-guided water gas relief holder of 160,000 cu.ft. capacity in brick tank built sixty-two years ago and still giving good service. The inlet pipe to this holder was only 14 in. diameter and became inadequate to deal with the increased quantity of gas made by the three water gas plants so that the back pressure on the plants was too high. This was remedied by laying an additional inlet pipe of larger size, 24 in. diameter, for which purpose the tank had to be emptied and a pit about 8 ft. sq. excavated to a depth of 33 ft., and then a tunnel driven under the tank wall. The work was stoutly timbered, and no difficulty was experienced, the ground being good hard clay. In spite of the depth and the proximity to the River Tees no trouble was experienced with water. The whole of the lattice girders between the columns on this holder were renewed recently, the old ones being found to have corroded so badly that the angles and flats were of only knife-edge thickness in many parts. The columns were well tied together temporarily while the old girders were removed and the new ones fitted in their place, one bay at a time.

The other gasholders are situated at the Marsh and Cannon Street Holder Stations. The former site, as its name implies, is a very bad one with a subsoil consisting of silt and peat for a depth of over 80 ft. No. 5 holder, built on this site in 1895, was of 2,200,000 cu.ft. capacity in a steel tank. The foundation was not piled, a plain concrete raft only being used without reinforcement, and a subsidence of 3 ft. took place as soon as the tank was filled with water. The holder was eventually brought to a fairly level foundation which enabled two of the three lifts to be worked until 1933. In that year a crack was noticed in one of the side plates in the second tier from

George III
George IV
William IV
Victoria
Edward VII
George V
Edward VIII
George VI



In this, the Coronation Year of our Gracious King, George VI, we celebrate our 144th birthday, and are proud to record that, as leading manufacturers of gas works plant, we have been closely associated with the Gas Industry through eight reigns.

Newton Chambers & Co Ltd
Thorncliffe Ironworks Nr Sheffield
1795 1937

the bottom through which the water was slowly percolating. In view of the tremendous strains to which the tank had been subjected from time to time and the danger of it splitting from top to bottom and releasing the 24,000 tons of water, the holder was immediately placed out of commission and two 4 in. diameter syphon pipes started running to empty the water, assisted later by a Pulsometer steam pump, and the tank was emptied in nine days. After this experience it was decided to abandon the holder and it was completely demolished and sold as scrap.

The other holder on the Marsh site, No. 4, is of the column-guided type in excavated tank with a capacity of 1¼ million cu.ft. in two lifts. This holder is fairly level and still working satisfactorily. The Governor House at this station has two Station Governors with 24 in. delivering mains, and four Keith's rotary compressors deliver gas through a 6 in. main for the high-pressure street lighting. Steam for anti-freezers on the gasholder is raised by a Lancashire boiler 7 ft. diameter by 30 ft. long.

To replace No. 5 holder after its being abandoned a contract was placed in 1934 for a new holder of 4 million cu.ft. capacity of the spirally-guided type with four lifts in steel tank to be erected at the Cannon Street Gasholder Station to the designs, specification, and quantities prepared by the Author. The foundation consisted of a reinforced concrete raft 194 ft. diameter, 7 in. thick in the body of the raft increased to 14 in. for a width of 9 ft. 6 in. round the outer edge and at the centre, supported on 921 piles of an average depth of 25 ft. 7 in. The piles were 16 in. diameter of the Simplex concrete cast-in-site type, spaced at 6 ft. centres. The maximum load on each pile is 39·2 tons, the calculated ultimate bearing capacity being 96 tons, giving a factor of safety of 2·4.

The tank is 191 ft. 3 in. diameter by 38 ft. 4 in. deep; the inner lift is 180 ft. diameter, the second lift 183 ft., the third lift 186 ft., and the outer lift 189 ft., the depth of each lift being 37 ft. 6 in. The crown is of the trussed type and has a rise of 12 ft. The pressure thrown by the various lifts is as follows:

Inner lift	7·0 in. water gauge
Two lifts	9·8 ,, ,, ,,
Three lifts	12·7 ,, ,, ,,
Four lifts	15·5 ,, ,, ,,

The cost of the foundations was £7,037 and of the gasholder and tank £36,468. To give access to the various lutes and to the crown the holder is equipped with ladders of the inclined staircase type. These are a great improvement on the old vertical type which are a real danger with the small foothold between the rung and the side sheets and the awkward gap to be climbed over where the spiral rails occur, especially when the ladder is coated with oil from the lutes, or with ice and snow. Since the erection of this holder it has been decided to fit staircases of this type to the No. 6 gasholder which is now laid off for this purpose, and it is hoped that you will see something of this work in hand during the course of your visit. The No. 6 holder is of 3 million cu.ft. capacity, of the spirally-guided type with four lifts in steel tank.

The total storage capacity is now 8¼ million cu.ft. which may appear high in relation to the maximum day's output of just under 5 million cu.ft. With a coke oven gas supply, however, a larger storage capacity is necessary to meet irregularities in production over which the gas undertaking has no control and to act as a reserve during strikes and accidents at the coke ovens, between the time when supplies from the coke ovens cease and the gas-making plant can be started up.

A gas-fired steam boiler has been installed at Cannon Street to generate steam for use in the anti-freezing apparatus. The boiler is 6 ft. 6 in. diameter by 9 ft. between tube plates and has a heating surface of 1,000 sq.ft. and is capable of evaporating 3,000 lb. of water per hr. with a working pressure of 120 lb. per sq.in.

The Station Governor House at Cannon Street has been equipped with two new 24 in. station governors. The outlet connection from No. 1 Governor delivers gas through a 24 in. trunk main to the Parliament Road area, and thence by an 18 in. diameter main to the Linthorpe Road area. From the outlet of No. 2 Station Governor a new 24 in. and 18 in. trunk main has been laid for a distance of two miles through the western and southern areas of the Borough. Middlesbrough has an ideal distribution system with its two Gasholder Stations, and 24 in. and 18 in. trunk mains radiating to all districts, and no difficulty is experienced in giving an adequate pressure at all points without recourse to high-pressure distribution.

A recording system is kept for all mains on Ordnance Sheets of 1/500 scale, of which 120 are required to cover the area. On these are indicated the size of mains, position in road or footpath and distance from building line, together with the position of important electric cables, high tension cables, telephone cable, and water mains. A sketch book is kept for recording in more detail special connections at important or congested points with records of levels, &c.

A new Stores Building has recently been completed of steel frame and brick panel construction 112 ft. long by 40 ft. wide by 24 ft. high to eaves with two floors, the cost of which worked out at the remarkably low figure of 3½d. per ft. cube. Here all stores for the Works and Distribution are kept, also appliances such as cookers, wash boilers, &c. A new building of similar design to the above is nearing completion for new Distribution Workshops.

The maximum hourly delivery occurs on Sundays during the cooking load between 12 noon and 1 p.m., and our record output during this hour is 652,000 cu.ft. in March last. On the same day during the three hours from 11 a.m. to 2 p.m. 1,591,000 cu.ft. were sent out.

During the last three to four years a striking change has gradually taken place. Formerly, as with most other gas undertakings, the maximum day's output every week occurred on Sundays due to the cooking load. While this load continues to increase it is regularly exceeded every Tuesday due to the washing-day load which is spread evenly over about six hours in the morning with no very pronounced peak. Monday may be popularly known as washing day, and a good deal is done in Middlesbrough on that day, but not so much as on Tuesdays.

The following table from a census taken last year gives some interesting figures of the number of appliances in use among the gas consumers of Middlesbrough.

Ordinary Meter Consumers.

—	Consumers' Own Property.	On Hire Purchase.	On Simple Hire.	Total.
Cookers	2,530	3,618	5,784	11,932
Fires	4,025	2,223	..	6,248
Wash boilers	6,388	953	..	7,341
Boiling rings	177	..	.	177
Irons, domestic	26	..	..	26
Irons, industrial	..	..	..	..
Water heaters	60	..	..	60
Hotplates	14	..	..	14
Stoving ovens	5	..	.	5
Baking ovens	15	..	..	15
Gas engines	7	..	..	7
Steam boilers	2	..	..	2
Linotype machine	1	.	.	1
Furnaces	10	..	..	10
Refrigerators	9	.	..	9
Central heating	40	..	..	40
Fish ranges	33	..	..	33

Prepayment Meter Consumers.

—	Consumers' Own Property.	On Hire Purchase.	On Simple Hire.	Total.
Cookers	349	353	20,209	20,911
Fires	4,063	92	..	4,155
Wash boilers	8,056	324	..	8,380
Boiling rings	759	..	..	759
Irons, domestic	10	..	..	10
Irons, industrial	45	..	..	45
Water heaters	4	..	..	4

Total Number of Appliances.

Cookers	32,843	Baking ovens	15
Fires	10,403	Gas engines	7
Wash boilers	15,721	Steam boilers	2
Boiling rings	936	Linotype machine	1
Irons, domestic	36	Furnaces	10
Irons, industrial	45	Refrigerators	9
Water heaters	64	Central heating	40
Hotplates	14	Fish ranges	33
Stoving ovens	5		

Number of Consumers.

Ordinary meters (dry)	13,795	
,, ,, (wet)	422	
		14,217
Prepayment meters		22,142
Total		36,359

The annual consumption per ordinary meter consumer, excluding industrial consumers and gas used for public lighting is 35,980 cu.ft. The annual consumption per prepayment consumer averages 24,900 cu.ft. The remarkably high number of cookers will be noticed, 90% of the consumers being provided with gas cookers, a very high degree of saturation. The mid-day peak loads on the output charts, which are made daily, show that gas is used for cooking purposes equally throughout the year, and is not restricted to summer when coal fires are not so much in use. Gas wash boilers are installed for 43% of the consumers and this figure is constantly growing, as also is the number of gas fires in use.

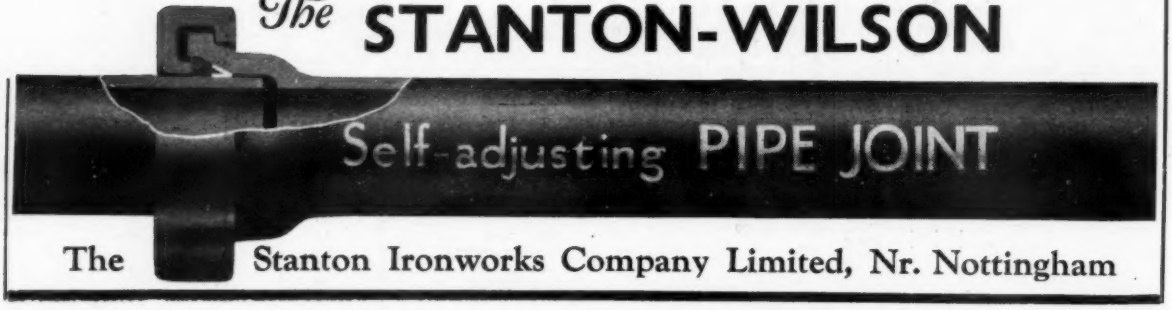
Traffic Vibration

Rigid or Self-adjusting Joints?

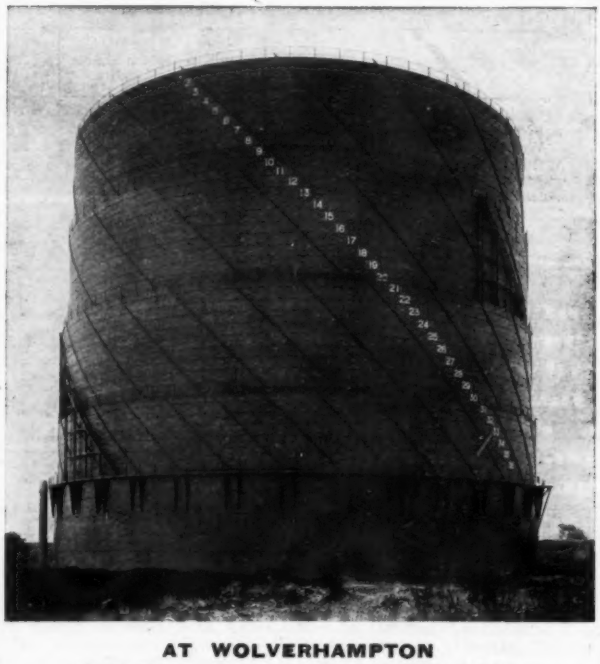
Not many of the problems brought into being by the remarkable growth of road transport during the last decade are capable of easy solution.

There is at least one exception, however. For instance, though much has been heard of the danger caused to historic buildings by traffic vibration, the harmful effects of such vibration on water and gas mains are not so apparent. To water and gas engineers responsible, however, for the maintenance of these essential public services, this was a very real problem until a few years ago, for rigidly-jointed mains could not be expected to withstand the severe vibration caused by modern conditions.

Some six years ago the Stanton Company introduced the Stanton-Wilson Self-adjusting pipe-joint to overcome this and similar difficulties. That it has successfully done so is proved by the fact that more than 1,500 miles of Stanton-Wilson mains have now been laid by over 750 public authorities.



The Stanton Ironworks Company Limited, Nr. Nottingham



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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

The new N.D.C. proposals met with general approval in the City, and on Thursday markets opened with a display of firmness. Any improvement in value, however, was discounted by the absence of buyers, and in most sections quotations closed lower on the week. The Account just ended has, in fact, been the slackest for some time, though towards the close on Friday there were indications of brighter things to come. Industrials became more cheerful, and steel, coal, and shipping shares began to harden. Home rails were quiet generally, though a demand for Great Western ordinary brought about a gain of 15s. on the week. An expansion in business is anticipated with the opening of the new Account this week.

Investors in Gas Stocks and Shares will have noticed that the new N.D.C. proposals exempt public utilities from the tax by reason of their statutory restrictions in regard to prices charged or dividends payable—a welcome and necessary relief, as the Industry will be affected severely enough in the future by the increased cost of coal.

The market was comparatively well supported last week and prices showed few changes. Fixed-interest stocks showed a tendency to harden, and it will be seen in the Official List that several of these were marked up a point. On the other hand, Imperial Continental eased 3 points to 153½, and South-Eastern 4% Preference closed 6d. lower to par. Quotations at the Provincial Exchanges and in the Supplementary List remained unchanged.

Associated Utilities, Ltd., a subsidiary of the Mid-Southern Utility Company, has made an offer for the acquisition of the whole of the issued ordinary and preference stocks and preference shares of the Reading Gas Company. The Directors of the Reading Company have recommended the proprietors to accept the offer. Associated Utilities was registered in 1933, and now directly controls the Basingstoke Gas Company as well as several electricity undertakings.

Current Sales of Gas Products

The London Market for Tar Products.

June 21.

Prices of tar products in the London market remain as last quoted, namely:

Pitch, 36s. to 37s. per ton f.o.b.

Creosote, 6d. to 6¼d.

Refined tar, 3¾d.

Pure toluole, 2s. 6d.; pure benzole, 1s. 9d.; 95/160 solvent naphtha, about 1s. 8d.; and 90/160 pyridine, about 8s.—all per gallon naked at makers' works.

Tar Products in the Provinces.

June 21.

The average prices of gas-works products during the week were: Gas-works tar, 22s. 6d. to 27s. 6d. Pitch—East Coast, 35s. to 36s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 35s. to 36s.* Toluole, naked, North, 2s. to 2s. 1d. Coal tar crude naphtha, in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 6½d. to 1s. 6¾d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5⅛d.; low gravity, 4⅜d. to 4½d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 3s. 7½d. to 3s. 10½d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene "A" quality, 4½d. to 4⅝d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *June* 19.

Deliveries are proceeding rapidly and prices are well maintained. New business is, however, rather scarce.

Crude gas-works tar.—The actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch continues to be quoted freely at round 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar.—Large quantities are leaving the Works with quotations unchanged at round 3d. to 3¼d. per gallon free on rails for export, and 3½d. to 3¾d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—A good demand exists for all grades, and prices are not lower than the following: Specification oil, 5½d. to 5⅝d. per gallon; low gravity, 6d. to 6¼d. per gallon; neutral oil, 5¼d. to 5½d. per gallon; all *ex* works in bulk.

Cresylic acid.—Only small supplies are available for which quotations are as under: Pale, 97/99%, 4s. 5d. to 4s. 7d. per gallon; dark, 97/99%, 4s. 2d. to 4s. 4d. per gallon; and pale, 99/100%, 4s. 10d. to 5s. 1d. per gallon; all *ex* works in buyers' packages.

Crude naphtha remains steady at 6d. to 6¼d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 4½d. to 1s. 5½d. per gallon, and 90/190 heavy naphtha is 11d. to 1s. per gallon.

Motor benzole is now valued at 1s. 4½d. to 1s. 5d. per gallon.

Pyridine.—Supplies are scarce with prices nominal at 7s. to 8s. per gallon for 90/160 grade, and 8s. to 9s. per gallon for 90/140 grade.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	10	to	0	10½	per gallon at works
Motor "	1	3¾	"	1	4	" " "
90% "	1	4¾	"	1	5	" " "
Pure "	1	8¾	"	1	9	" " "

Contracts Advertised To-Day

Air Compression Tank.
Sutton-in-Ashfield Waterworks Department. [p. 950.]

Air Compressor.
Sutton-in-Ashfield Waterworks Department. [p. 950.]

Coal.
Todmorden Gas Department. [p. 949.]

Electric Motors.
Sutton-in-Ashfield Waterworks Department. [p. 950.]

Electrical Control Gear.
Sutton-in-Ashfield Waterworks Department. [p. 950.]

Gasholder Materials.
Wallasey Gas Department. [p. 950.]

Paint.
Burton-upon-Trent Gas Department. [p. 950.]

Turbine Booster Pumps.
Sutton-in-Ashfield Waterworks Department. [p. 950.]

Water Pumping Machinery.
Wallasey Gas Department. [p. 950.]

Wiring, Cast Iron Pipes and Connections.
Sutton-in-Ashfield Waterworks Department. [p. 950.]

Further Gas Undertakings' Results

Evesham.

The annual report of the Evesham Borough Gas Undertaking shows that there was a gross profit of over £3,000 last year and a net profit of a little less than £2,000. The sales during the year have increased from £27,052 to £28,671.

Lochmaben.

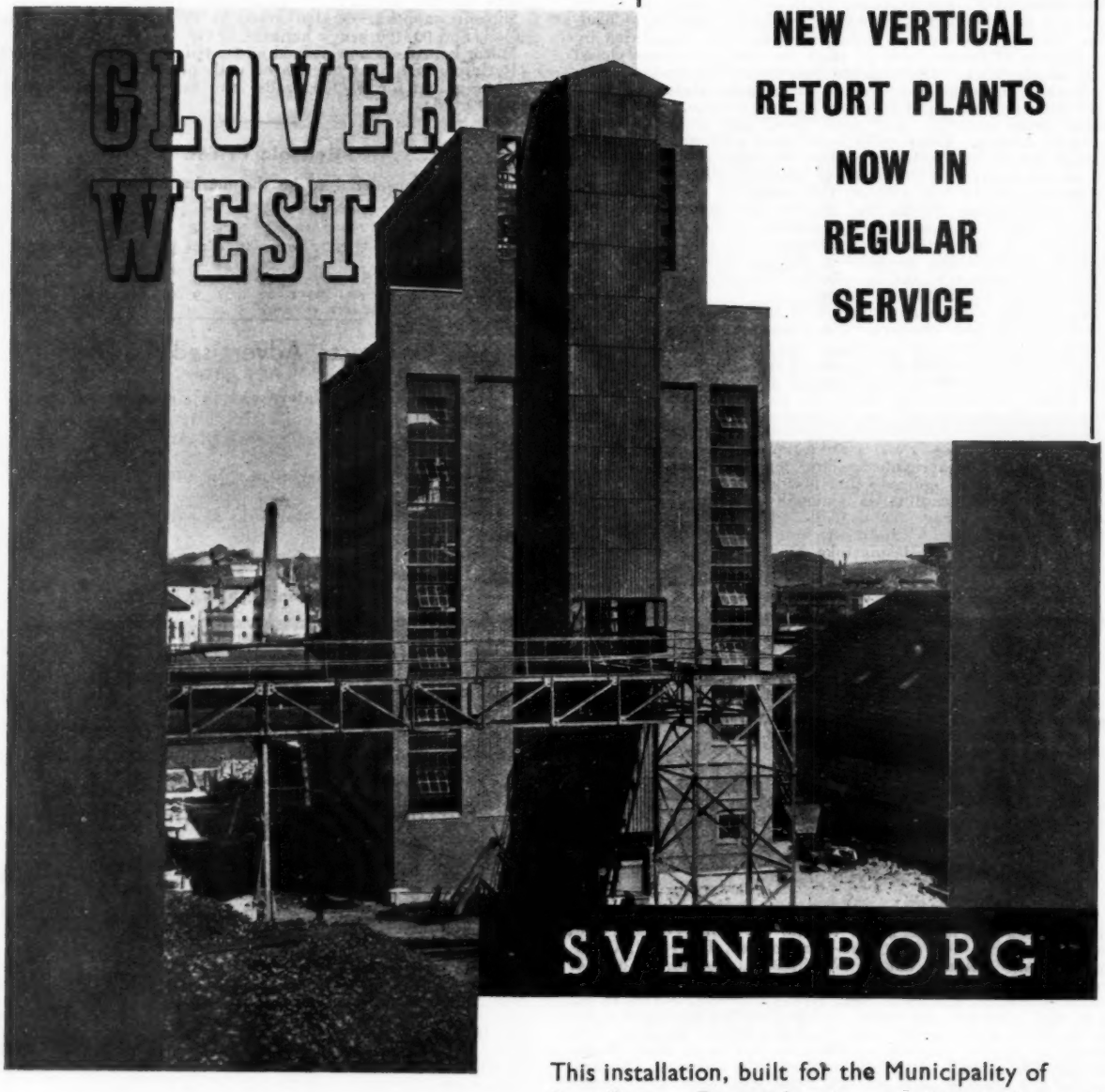
The Lochmaben Gas Department shows a make for the year of 17,200,200 cu.ft., being 560,000 cu.ft. less than for the previous year. Coal used was 1,559 tons—50 tons less—the average make per ton being 6 cu.ft. less at 11,038 cu.ft. Coke revenue was £874, crude tar revenue £23, and dehydrated tar revenue £303—an increase of £89. Light oils produced £125 and showroom sales £599—an increase of £101.

Wells.

During the year the Directors of the Wells Gas Light Company have negotiated for the purchase of property in Broad Street to re-construct as central showrooms and the purchase has been completed since March 31. The Directors have decided to put down an additional 8-in. steel-welded trunk main to be used later for the distribution of gas under increased pressure. The quantity of gas sold was 43,777,700 cu.ft. (5,384,650 units) as compared with 42,567,600 cu.ft. (5,246,900 units) in 1936, an increase of 2·8%. Carbonizing results continue at the standard of previous years and the unaccounted for gas remains low. Sales of gas appliances were as follows: High-grade cookers, 79; wash boilers, 20; boiling rings and gas irons, 36; water heaters, 30; fires and radiators, 56; lighting points, 288; sundries, 47. The gross receipts for the year amounted to £14,194, and the expenditure to £10,809, leaving a balance profit of £3,385 as compared with £3,021 in 1936. The credit balance of profit and loss account to be carried to the next account is £2,855. The Directors recommend the payment of final dividends for the year as follows: On ordinary and preference stock at the rate of 2½%; on new (1925) preference stock at the rate of 3¼%, making with interim dividends paid in December, 1936, 5% and 6½% for the year, less tax. A sum of £480 is to be transferred to the credit of renewal fund account.

GLOVER WEST

NEW VERTICAL RETORT PLANTS NOW IN REGULAR SERVICE



This installation, built for the Municipality of Svendborg, Denmark, is an interesting example of the modern Glover-West vertical retort plant designed for the smaller works. It is an eight-retort unit with fuel-gas producers equipped for breeze-burning, waste-heat recovery plant and electric lift. Coaling is by means of an automatic skip-hoist.

400 plants in 24 countries

WEST'S GAS IMPROVEMENT CO., LTD.

MANCHESTER: ALBION IRONWORKS, MILES PLATTING ■ LONDON: COLUMBIA HOUSE, ALDWYCH, W.C. 2

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

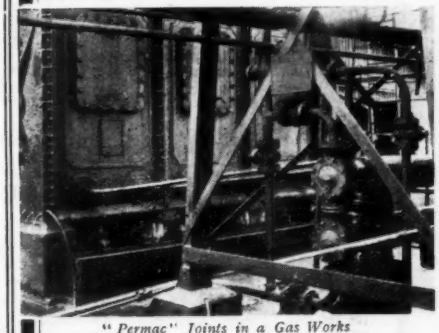
Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations June 18.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Mar. 15	8	8	Alliance & Dublin Ord. ...	170—175	...	...
374,000	,,	Dec. 14	4	4	Do. 4 p.c. Deb. ...	96—101	...	...
558,890	,,	Feb. 15	7	7	Barnet Ord. 7 p.c.	160—165	...	...
300,000	1	Apl. 5	1/4⅛	1/9⅜	Bombay, Ltd.	25/6—27/6	...	26/—27/-
179,915	Stk.	Mar. 1	9½	9½	Bournemouth sliding scale ...	195—205	...	...
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	161—166	...	...
493,960	,,	,,	5	6	Do. 6 p.c. Pref ...	133—138	...	133—134
50,000	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	90—85	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	118—123	...	...
357,900	,,	Feb. 15	7½	7½	Brighton, &c., 6 p.c. Con. ...	155—160	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	138—143	...	140
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	130—135	...	131—133
855,000	,,	Mar. 1	7	8	British Ord.	148—153	...	152
100,000	,,	Dec. 14	7	7	Do. 7 p.c. Pref.	143—148	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...	...
120,000	,,	June 7	4	4	Do. 4 p.c. Red. Deb. ...	95—100*	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	102—107*	...	...
450,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100*	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	40/-
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1⅛—3⅛	...	...
150,000	Stk.	Jan. 4	4½	4½	Do. 4½ p.c. Deb. ...	80—85	...	80
626,860	,,	Feb. 1	6	6	Cardiff Con. Ord.	120—125	...	...
237,860	,,	June 7	5	5	Do. 5 p.c. Red. Deb.	107—112*	...	...
98,936	1	Apl. 5	2/-	2/-	Colombo Ord.	1⅜—1⅞	...	...
24,510	1	,,	1/4⅛	1/4⅛	Do. 7 p.c. Pref. ...	23/—25/-	...	...
739,453	1	Mar. 15	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/—19/-	...	...
296,144	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/-	...	...
1,775,005	Stk.	Feb. 1	5	5	Commercial Ord.	88—93	...	92
620,000	,,	June 7	3	3	Do. 3 p.c. Deb. ...	74—79*	...	75½—77
286,344	,,	Feb. 15	5	5	Do. 5 p.c. Deb. ...	115—120	...	...
807,560	,,	Feb. 15	7	7	Croydon sliding scale ...	143—148	...	146—147½
644,590	,,	,,	5	5	Do. max. div.	109—114	...	110½—111½
620,385	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	115—120	...	...
239,000	,,	Feb. 1	...	5	East Hull Ord. 5 p.c.... ...	100—105	...	...
185,355	,,	Feb. 15	6	6	East Surrey Ord. 5.p.c. ...	122—127	...	...
176,211	,,	June 7	5	5	Do. 5 p.c. Deb. ...	113—118*	...	...
250,000	1	Nov. 16	6	4	Gas Consolidation Ord. ...	20/—22/-	...	...
250,000	1	May 24	4	4	Do. 4 p.c. Red Cum. Pref.	19/—21/-	...	...
19,255,284	Stk.	Feb. 1	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	25/—26/-a	...	24·9—25/6
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	81—84	+ 1	82—84
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	100—103	...	101⅛—102½
2,993,000	,,	...	...	...	Do 3¾ p.c. Red. Pref.	100—103	...	102—102½
8,602,497	,,	May 24	3	3	Do. 3 p.c. Con. Deb. ...	80—83	...	82⅛—83
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	110—113	+ ½	111⅛—112½
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb....	109—112	+ 1	109—111
700,000	,,	Mar. 1	25/5⅜	3½	Do. 3½ p.c. Red. Deb....	98—101	...	...
270,466	,,	Feb. 15	6	6	Harrogate New Cons. ...	122—127	...	...
213,200	,,	Feb. 15	6	6	Hornsey Con. 3½ p.c. ...	120—125	...	...
5,600,000	,,	May 24	8	12	Imperial Continental Cap. ...	151—156	−3	152⅛—157⅜
223,130	,,	Feb. 1	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...	...
285,242	,,	Mar. 1	8½	8½	Lea Bridge 5 p.c. Ord. ...	160—165	...	...
11,751	,,	Mar. 1	8	10	Maidstone Gas 5 p.c. Cap. Stk.	180—190	...	...
63,480	,,	Dec. 14	3	3	Do. 3 p.c.Prp.Db.Stk.	72—77	...	...
75,000	,,	May 24	†10	†10	Malta & Mediterranean ...	150—160	...	...
392,000	—	Apl. 1	5⅛	5⅛	Metropolitan (of Melbourne) 5⅛ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Feb. 15	5	5	M.S. Utility 'C' Cons. ...	102—107	...	...
968,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95—100	...	99
360,075	,,	Dec 14	4	4	Do. 4 p.c. Deb. ...	97—102	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	115—120	...	...
125,000	—	Jan. 4	3⅛	3⅛	Do. 3⅛ p.c. Rd.Rg.Eds.	97—100	...	...
675,000	Stk.	May 3	†6	†9	Montevideo, Ltd.	85—90	...	88—89½
250,000	,,	Feb. 15	7½	7½	North Middlesex 6 p.c. Con.	152—157	...	...
396,160	,,	Feb. 1	5	5	Northampton 5 p.c. max. ...	102—107	...	...
300,000	,,	Apl. 19	†9	†7	Oriental, Ltd....	162—167	...	...
468,537	,,	June 7	8	8	Plymouth & Stonehouse 5 p.c.	160—170*	...	...
621,667	,,	Feb. 15	8½	8½	Portsmouth & Gosport Cons.	167—172	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	105—110	...	...
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	112—117	...	...
441,275	1	May 3	1/-	1/1⅛	Severn Val. Gas Cor. Ld. Ord.	21/—23/-	...	21/9—22/6
460,810	1	Mar. 15	-/10⅛	-/10⅛	,, ,, 4½ p.c. Cum. Pref.	20/—22/-	...	...
133,201	Stk.	Feb. 15	5	8½	Shrewsbury 5 p.c. Ord. ...	140—145	...	...
90,000	10	June 7	†4	†4	South African...	3⅜—4⅜*	...	...
1,371,752	1	May 3	1/2⅞	1/2⅞	South East'n Gas. Cn.Ld. Ord.	24-/—26/-	...	25/—25/9
871,636	1	Mar. 1	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pref.	20/—22/-	...	22/-
498,818	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	19/—21/-	−·/6	19/-
450,000	‡	Feb. 15	4	4	Do. 4 p.c. Deb.	100—102	...	...
150,000	Stk.	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	99—101	...	...
6,709,895	,,	Feb. 1	5	6	South Met. Ord.	107—110	...	108—109½
1,135,812	,,	,,	6	6	Do. 6 p.c Irred. Pf. ...	132—137	...	132½
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	98—101	+ 1	100½—101
1,895,445	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	76—81	+ 1	77½—78
1,000,000	,,	Jan. 4	5	5	Do. 5 p.c. Red. Deb....	107—112	...	...
1,543,795	,,	Feb. 1	6	6	South Suburban Ord. 5 p.c....	122—127	...	124—126
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	112—117	...	...
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	95—100	...	101
888,587	,,	June 7	5	5	Do. 5 p.c. Deb....	115—120*	...	118—118½
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	97—102*	...	...
200,000	,,	...	...	...	Do. 3½ p.c. Red. Deb.	94—98	...	97½
427,859	1	May 3	9⅜	1/2⅜	S. Western Gas & Water Ord.	19/—21/-	...	20/-
160,523	1	Apl. 19	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pf.	20/—22/-	...	...
110,000	Stk.	Dec. 14	4	4	Do. 4 p.c. Red. Deb. ...	98—103	...	...
750,541	,,	Feb. 1	5	5⅛	Southampton Ord. 5 p.c. ...	111—116	...	114½—115½
148,836	,,	June 7	4	4	Do. 4 p.c. Deb.	97—102*	...	...
350,000	,,	Feb. 15	5⅛	5⅛	Swansea 5½ p.c. Red. Pref. ...	110—115	...	...
106,000	,,	June 7	6½	6½	Do. 6½ p.c. Red. Deb. ...	97—100*	...	...
94,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100*	...	97½
1,076,490	,,	Feb. 15	6⅜	6⅜	Tottenham and District Ord.	137—142	...	141½—142
409,835	,,	,,	5⅛	5⅛	Do. 5⅛ p.c. Pref....	123—128	...	125
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
371,850	,,	June 7	4	4	Do. 4 p.c. Deb. ...	97—102*	...	...
373,939	,,	Feb. 15	7	7	Uxbridge, &c., 5 p.c. ...	142—147	...	...
133,010	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
1,371,138	,,	Feb. 1	7	7	Wandsworth Consolidated ...	143—148	...	...
1,620,615	,,	,,	5	5	Do. 5 p.c. Pref ...	113—118	...	115
500,000	,,	,,	33/4	4	Do. 4 p.c. Pref. ...	97—100	+ 1	99—100
1,343,964	,,	June 7	5	5	Do. 5 p.c. Deb. ...	115—120*	...	116
383,745	,,	,,	4	4	Do. 4 p.c. Deb. ...	97—102*	...	...
558,342	,,	Feb. 1	7	7	Watford and St. Albans Ord.	142—147	...	145½
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
200,000	,,	,,	5⅛	5⅛	Do. 5⅛ p.c. Pref. ...	123—128	...	...
200,000	,,	June 7	4	4	Do. 4 p.c. Red. Deb.	97—102*	...	...
100,000	,,	,,	3½	3½	Do. 3½ p.c. Red.Deb.	95—100*	...	...

a.—The quotation is per £1 of Stock. * Ex div. † Paid free of income-tax. ‡ For year. § Actual.

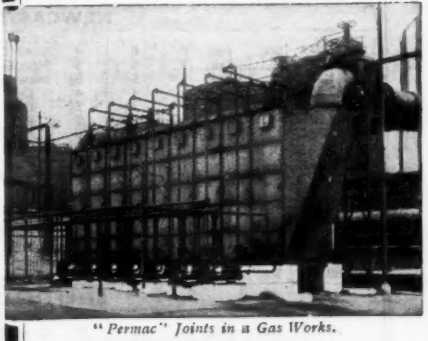
Stock and Share List continued overleaf.

There's only one Permac!

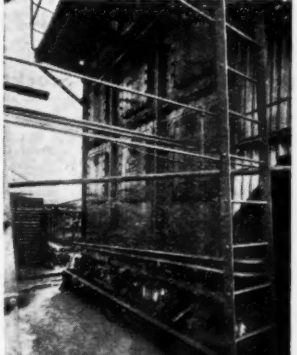
METAL-TO-METAL JOINTING MATERIAL.



"Permac" Joints in a Gas Works



"Permac" Joints in a Gas Works.



"Permac" Joints in Gas Works.

Be sure you get it!

"Permac" *makes leak-proof joints which last till you want to break them down.* For over 25 years it has been holding up difficult joints in important Gas Works and on Coke Oven Plant all over the country. Here are a few photographs. Beware of cheap imitations.

Sole manufacturers:

THOMAS & BISHOP LTD.

37, Tabernacle St.

LONDON, E.C. 2

Telephone: Clerkenwell 3351 (2 lines)

STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. June 18.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	Feb. 1	5	6	Bath Cons.	121—123	...	...
1,667,250	,,	Feb. 15	5	5	Bristol, 5 p.c. max.	116—117	...	...
120,420	,,	June 7	4	4	Do. 1st 4 p.c. Deb. ...	100 —102½*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100½—102½*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	120—123*	...	...
274,000	,,	Mar. 1	5	5	Newport (Mon.) 5 p.c.max. ...	103—108	...	...
13,200	12	Mar. 15	7	8	Pontyp'l Gas & W. 10 p.c. 'A'	13½—14½	...	...
13,600	10	,,	5	6	Do. 7 p.c. 'B'	12—12½	...	...
40,000	10	,,	5	6	Do. 7 p.c. 'C'	12—12½	...	...
140,778	Stk.	Feb. 1	5	5	Weston-super-Mare Cons. ...	112—113	...	...
64,338	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	98—101	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	160—163	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Feb. 1	5	6½	Chester 5 p.c. Ord.	106—111	...	...
92,500	,,	Dec. 14	4½	4	Do. 4 p.c. Pref.	98—102	...	...
36,430	,,	,,	3	3½	Do. 3½ p.c. Deb....	90—95	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	99—103	...	...
2,167,410	,,	Feb. 15	6	6	Liverpool 5 p.c. Ord. ...	125½—127½	...	...
245,500	,,	Dec. 14	5	5	Do. 5 p.c. Red. Pref. ...	101—106	...	...
306,083	,,	Jan. 4	4	4	Do. 4 p.c. Deb. ...	103—105	...	...
106,280	,,	Feb. 1	10	10	Preston 'A' 10 p.c.	210—220	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	150—160	..	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Feb. 1	8	8	Blyth 5 p.c. Ord.	166—168	...	...
732,000	,,	Feb. 15	5	5	Hartlepool G. & W. Cn. & Nev	124—126	...	...
2,061,315	,,	Feb. 1	5	5½	Newcastle & Gateshead Con.	25/3—25.9a	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	100—101	...	...
776,706	,,	Jan. 4	3½	3½	Do. 3½ p.c. Deb. ...	93—94	...	...
277,285	,	Nov. 2	5	5	Do. 5 p.c. Deb. '43...	108—109	...	...
332,351	,,	Feb. 1	6	6	Sunderland 6 p.c. max. ...	139—141	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Mar. 1	7	9	Derby Con.	155—165	...	...
55,000	,,	June 7	4	4	Do. 4 p.c. Deb.	100—105*	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	...
20,000	10	Dec. 14	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	210—220	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	210—220	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—210	...	...
1,806,339	,,	Feb. 15	6	6½	Sheffield Cons.	144—146	...	...
95,000	,,	Jan. 4	4	4	Do. 4 p.c. Deb.... ...	101—104	...	...

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Mar. 15	25/-b	25/-b	Ascot Ord.	102—107	...	...
128,182	,,	Jan. 4	5	5	Do. 5 p.c. Pref.	110—115	...	...
474,410	1	May 24	5	5	Assd. Gas and Water Ord. ...	19/6—21/6	...	...
500,000	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	19/6—21/6	...	...
500,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	97½
17,000	,,	Feb. 15	8	8	Bognor Orig. Ord. 'A' ...	160—170	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	160—170	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	140—145	...	...
37,440	,,	Feb. 1	10	10	Cam. Univ. & Town 10 p.c.max.	195—205	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	137—142	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	98—103	...	...
65,000	,,	Mar. 1	7½	8½	Eastbourne 'A' 5 p.c. ...	160—165	...	...
198,000	,,	,,	6	7	Do. 'B' 3½ p.c.	130—140	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
130,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	115—120	...	...
24,000	30	Feb. 1	8½	8½	Great Yarmouth 8½ p.c. max.	45—50	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.	40—45	...	...
51,160	Stk.	June 7	5½	5½	Do. 5½ p.c. Deb.... ...	120—125*	...	...
152,600	,,	Feb. 15	8	9	Guildford Cons.	190—200	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	112—117	...	...
68,250	,,	June 7	5	5	Do. 5 p.c. Deb.	113—118*	...	...
156,600	,,	Feb. 15	7½	7½	Hampton Court Cons. ...	155—160	...	...
107,960	10	Mar. 15	4	5½	Mid Kent Ord.	9—10	...	...
230,940	Stk.	Feb. 15	10	10	Oxford & District Ord. ...	200—210	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	112—117	...	...
126,193	,,	May 3	7½	7½	Peterborough Ord.	159—169	...	...
64,990	,,	Mar. 15	6½	7½	Redditch Ord.	127—137	...	...
166,850	,,	Feb. 15	8	8	Romford Ord.	157—167	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Mar. 15	5	5	Do. 5 p.c. Deb.	115—120	...	117½
10,950	,,	Mar. 1	8	8	Ryde Ord.	160—165	...	...
136,191	,,	Feb. 15	9	7	Scarborough Ord.	123—133	...	...
27,825	,,	Feb. 1	8	8	Shanklin & Ventnor Cons. ...	158—168	...	...
270,086	,,	Mar. 15	7	7	Slough Ord.	137—142	...	...
21,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	113—118	...	...
28,872	1	May 24	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/-	...	...
28,866	1	Mar. 15	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...	...
137,730	Stk.	Feb. 15	7	7	Southgate & Dist. 7 p.c. max.	140—145	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
117,228	,,	Feb. 15	6	5	Swindon Cons.	108—113	...	...
60,425	,,	June 7	5	5	Do. 5 p.c. Deb.	111—116*	...	...
64,380	,,	June 7	5	5	Torquay and Paignton 5 p.c. Pf	113—118*	...	...
1750,000	1	Apl. 5	4	6	Utd. Kingdom Gas Cpn. Ord.	20/6—22/6	...	21/—21/3
936,338	1	May 3	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-	...	20/9—21/3
674,084	1	June 7	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pref.... ...	17/—19/-*	...	17/9—18/-
600,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...	97½
130,000	,,	Feb. 15	5	8	Wakefield Ord.	126—131	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	103—108	...	...
82,000	,,	Feb. 1	6	6	Weymouth Ord.	103—108	...	...
98,384	,,	Feb. 1	6	6	Wolverhampton 6 p.c. Pref....	125—130	...	...
160,000	,,	Dec. 14	5½	5½	Do. 5½ p.c. Rd. Db	110—115	...	...
370,000	,,	Feb. 15	4	6	York Cons.	105—110	...	...
90,000	,,	Dec. 14	5	5	Do. 5 p.c. Red. Deb. ...	105—110	...	...
133,640	,,	Mar. 1	6½	6½	Yorktown (Cam.) 5 p.c ons.	130—135	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
35,000	,,	June 7	5½	5½	Do. 5½ p.c. Deb.... ...	123—128*	...	...

a The quotation per £1 of Stock b Annual for Quarter. * Ex div.

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